NOLOGY DEPARTMENT

Telephone ENGINEER and MANAGEMENT

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MARCH 1947

Featuring

AUTOMATIC-TYPE BATTERY CHARGERS INSURE LONG BATTERY LIFE
By John S. Reed
Page 26

•

INGENUITY OF TELEPHONE INDUSTRY WHIPPING HELD ORDER SITUATION
By John G. Reynolds
Page 29

•

PERSONAL RECOGNITION OF EMPLOYEES AIDS EMPLOYEE-EMPLOYER RELATIONS
By Virginia Dull
Page 31

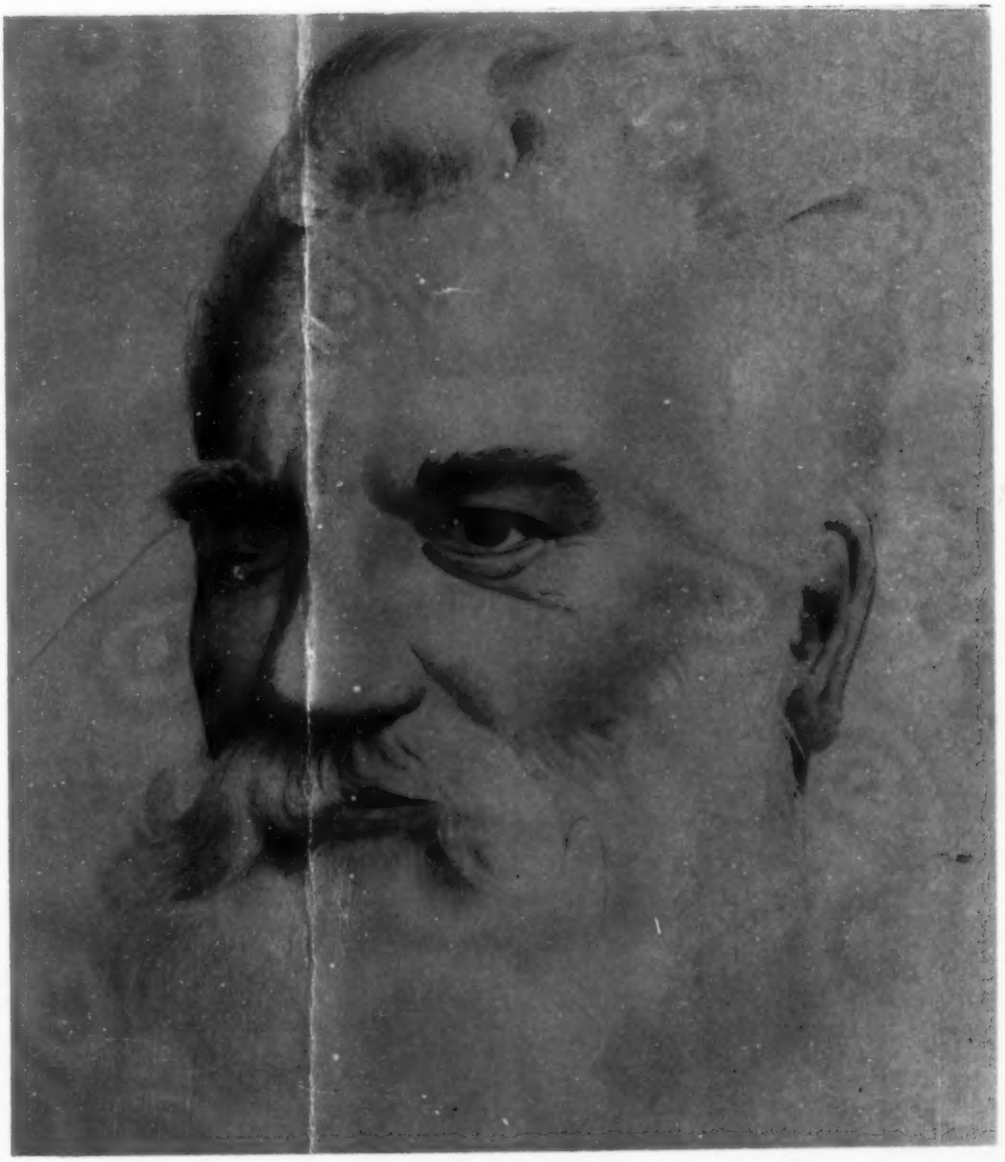
•

Editorial on Page 19

•

The Cover Picture—

Our March cover is a tribute to the revered memory of Alexander Graham Bell, born in Edinburgh, March 3, 1847. Teacher, Scientist, Inventor, Humanitarian, and Founder of the Telephone Industry.



Edgerton, WISCONSIN

• ***Leaf Tobacco Capital of the World and Home of the "Edgerton" Shoe. In this prosperous American community, as in more than 1000 others, Telephone Directories are published by General Telephone Directory Company.***

Top: A colorful field of leaf tobacco, typical of many in the Edgerton area.

Lower: Aerial view of the Highway Trailer Company. This plant has the longest continuous assembly line in the semi-trailer industry.

The colorful tobacco warehouses which line one side of Edgerton's main street contradict the popular idea that the famous Wisconsin Dairy Industry is that state's only farm interest. Buyers from all nations come here every year to select cigar fillers and the materials for chewing tobacco and snuff.

Nor is agriculture the only pursuit of this area. Other enterprises of national importance have located here. Among these and of special interest to the telephone industry is the Highway Trailer Company which makes utility bodies for Telephone Company trucks; earth boring equipment for setting poles; winches, pole trailers and the new cable laying plows. Another nationally famous concern is the Nunn-Bush Shoe Company, makers of the popular "Edgerton Shoe" which carries the name of this city to every corner of the nation.

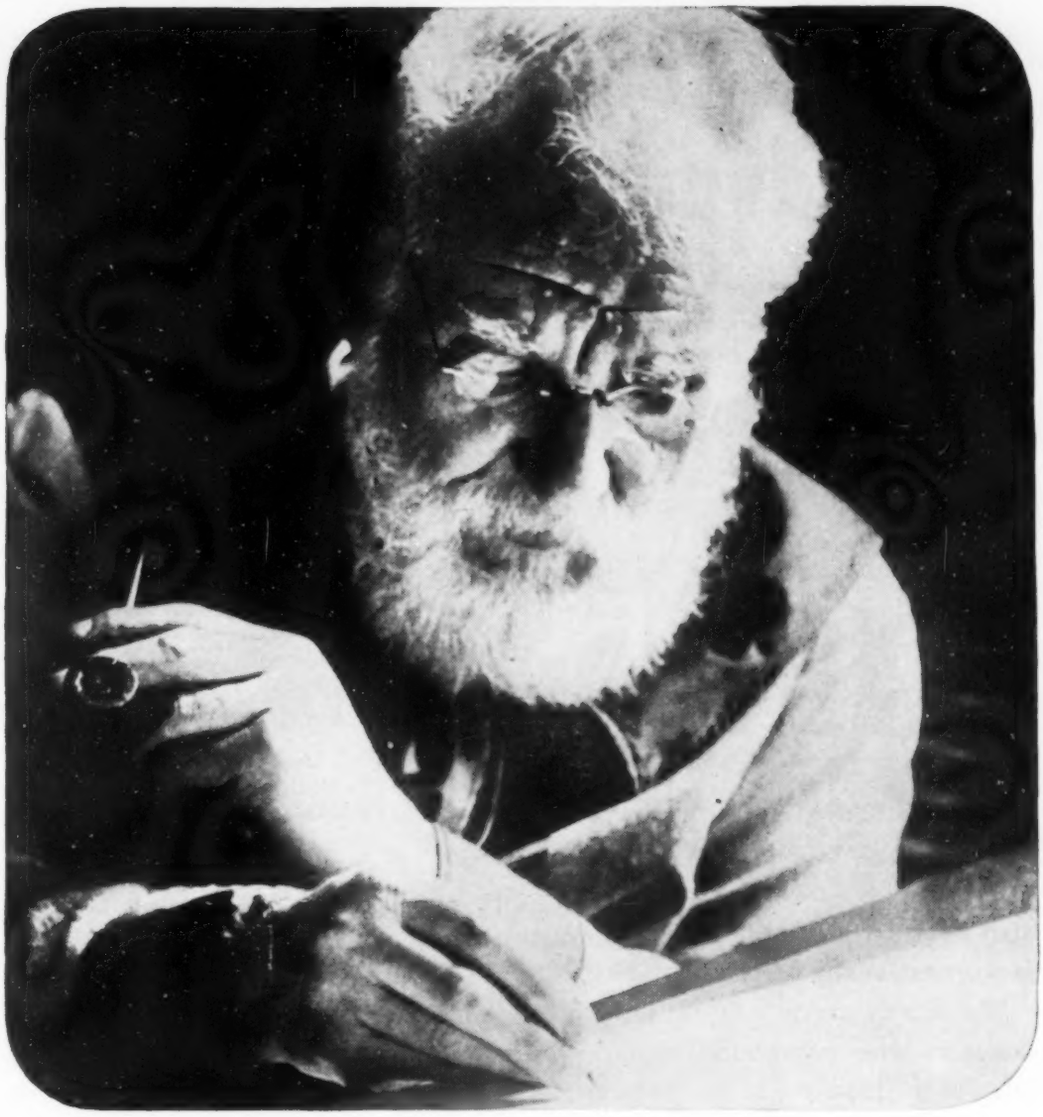
For the past 10 years, all details of publishing the Edgerton Telephone Directory for the Commonwealth Telephone Company have been handled by General Telephone Directory Company. During this time the operating Company has not only enjoyed substantial increases in gross advertising revenue, but they have been completely relieved of all details in connection with the sale of advertising and publication. In Edgerton, as in more than 1000 other American cities and towns served by our Company, our representatives assume all responsibility for accuracy and prompt delivery of telephone directories.

If your present directory publishing procedure is inconvenient or inadequate; if you would like to have a neat, accurate directory to deliver to your subscribers without all of the countless, exasperating details ordinarily encountered, we shall be glad to provide complete information regarding the service we offer without obligation.

GENERAL TELEPHONE DIRECTORY COMPANY

EASTERN OFFICE: 185 NORTH WABASH AVENU[illegible] CHICAGO, 1, ILLINOIS, TELEPHONE STAT[illegible] 5479

WESTERN OFFICE: PRESS-TELEGRAM BUILDING, [illegible] LONG BEACH 12, CALIFORNIA, TELEPHONE [illegible] 72-22



100 years ago this month a great inventor was born

This month the world commemorates the 100th birthday of Alexander Graham Bell, who was born on March 3, 1847. Like his father and grandfather, he was a physicist specializing in phonetics, particularly as it applied to teaching the deaf to speak. It was his experiments in this field that finally, one week after his 29th birthday, led to his invention of the telephone.

So fast and far has telephone progress advanced since Bell's invention, that it may well be called one of the wonders of the modern world. And no one has contributed as much to this progress as the great telephone companies of America. This is a natural result of the telephone spirit of service and its tradition of faithfulness and dependability.

In Exide Batteries you will find the same dependability for which telephone service is famous throughout the world. Since 1895, Exides have been proving themselves worthy of that trust.

Exide
BATTERIES

THE ELECTRIC STORAGE BATTERY CO., Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

VOLUME 51, NUMBER 3, Published monthly by Telephone Engineer Publishing Corporation. Office of Publication, Pontiac, Illinois. Executive and Editorial Office, 7720 Sheridan Road, Chicago, Illinois. Subscription: U. S., Cuba, Mexico, $2.00 per year; Canada $2.50, in all other countries, $4.00. Single copies, U.S.A. 20 cents; single copy JANUARY 15 BLUE BOOK BUYERS' GUIDE $1.50. Entered as second class matter at the post office at Pontiac, Illinois, under the act of March 3, 1879.

See for Yourself the Advantages of Drop Wire Jacketed with

DURABLE, WEATHER-RESISTANT NEOPRENE

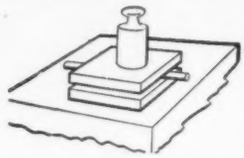
WE SUGGEST you make these tests yourself with samples of commercial neoprene-jacketed drop wire. You'll see that the neoprene jackets can really take it.

We supply crude neoprene to wire manufacturers who compound it into jackets for telephone drop wire, portable cords, aerial cable, riser cable, railroad cable, and many other types of wire and cable products. In every case the neoprene jacket gives the wire resistance to abrasion, cutting, sunlight, ozone, weather, oil and grease, and aging and oxidation. You'll find neoprene jackets on the best wire and cable. Always specify neoprene jackets when you buy.

WRITE FOR your free subscription to *The Neoprene Notebook*. Keeps you up to date on new uses for neoprene in plant equipment. Back file available on request.

MAKE THESE TESTS YOURSELF

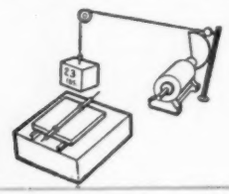
Pressure increased to point of failure



1. COMPRESSION TEST

See how the neoprene-jacketed wire stands up when crushing pressure is applied.

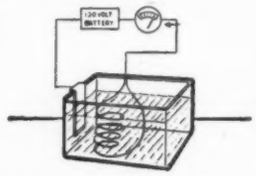
25 blows per minute, 6½-inch drop



2. POUNDING TEST

See how long it takes to crush a neoprene-jacketed wire when weight is dropped on wire repeatedly. Shows the ruggedness of neoprene for tough installations.

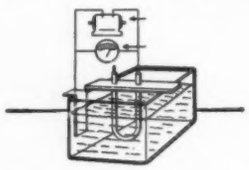
120-volt battery and galvanometer



3. INSULATION TEST

See how little leakage there is when neoprene-jacketed wire is immersed in water. Shows the better electrical properties of wet drop wire when neoprene jackets are used.

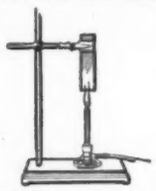
High-voltage generator and voltmeter



4. BREAKDOWN TEST

See how much voltage you can apply to neoprene-jacketed wire immersed in water before failure.

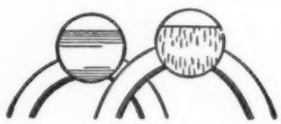
Du Pont vertical tube flame test



5. FLAME TEST

Prove to yourself that neoprene does not propagate flame in this Underwriters test. Shows why neoprene will not carry a flame into a building.

Exposed under strain to sunlight, weather



6. WEATHER TEST

See how neoprene stands up under sunlight, temperature changes or smoke and chemical fumes. Long-term tests show neoprene jacket is in good condition after ten years of service.

RUBBER CHEMICALS DIVISION, M-3
E. I. du Pont de Nemours & Co. (Inc.)
Wilmington 98, Delaware

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

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FOR BETTER WIRE AND CABLE, SPECIFY

DU PONT NEOPRENE

THE *VERSATILE* SYNTHETIC RUBBER

Jay G. MITCHELL'S *Commentary*

Editor's Notice: The opinions expressed herein by Jay G. Mitchell are his own. The Editor reserves the right to disagree with any of them, editorially or otherwise in the columns of this publication at any time.

ENCOURAGING: The study of the division of revenue between local telephone systems and long distance circuits by the National Association of Railroad and Utility Commissioners is encouraging. State Utility Commissions are closely in touch with revenue conditions of local telephone systems. Their files contain accumulated data covering long periods for large and small telephone companies. These data can be analysed and the true cost of supplying long distance service that must be incurred by the local company can be determined. In any consideration of telephone rates, whether for toll service or local and rural exchange service, it is important that the division of toll revenue shall be on a sound basis.

A great deal of careful and helpful work has been done on this matter with the result that the part of toll revenue received by the local telephone system has been inched upward from time to time. Consideration of the matter shows, however, that even now the rendition of the long distance service to the toll using public is probably not profitable in itself to the local telephone system. The selling, accounting, collecting, operating and maintenance costs that can properly be charged to the toll service, **when separated out in a thorough study,** will produce two probable results. They will justify an increased payment out of the tolls to the local system and will to the same degree relieve the costs of local and rural exchange service of substantial amounts.

Southeastern commissions first passed a resolution urging such a study and the annual convention of State Commissioners at Los Angeles, on November 14, 1946, approved the idea. The Federal Communications Commission has now announced that pending the completion of a cooperative study to be made by the State Commissions any action looking to a reduction of interstate tolls of The American Telephone and Telegraph Company will be deferred.

• • •

COMMUNICATION ENGINEERING: This magazine has consistently advocated the establishment of more **complete specialized required courses** of study in the universities for students desiring to specialize in communications. In a press release just received the appointment of Dr. Leo L. Beranek, formerly Director of the Electro-Acoustic and the Systems Research Laboratories of Harvard University, as **Associate Professor of Communications Engineering** in the Department of Electrical Engineering of the Massachusetts Institute of Technology, is announced by Dr. Karl T. Compton, President. It is

to be hoped that other institutions of learning will find it possible to follow the same course.

• • •

SKY PILOT: Jokesmiths and cynics will get some material from this. A Rhode Island shoe manufacturer announces that he has employed an outstanding Baptist preacher as a religious trouble shooter. The minister's salary will be paid by the shoe manufacturer. His instructions are said to come from above as they did when he occupied a pulpit. Everyone knows what the alleged humorous comment will be. I think it may be a wise move. Industry under existing conditions cannot be harmed by the admixture in management of a little highminded and unselfish thinking. The successful minister should be able to sell ideas to business. For one thing he can supervise, in this new job, the contributions to welfare and charitable agencies made by his employer. To this work the trained minister can bring needed improvement over a hit and miss business welfare policy. In employee relations his professional approach to mental attitudes will certainly be helpful. On the whole it appears good when viewed from the practical angle. The danger, if any, will be that assured income and delegated responsibility may cause him to forget his ethical and religious obligations. It has happened in other cases. The plunge into modern business of a man with the outlook and training of a preacher is a change. We venture to hope that he will remember to spell it p-r-a-y and not p-r-e-y.

• • •

AN IDEA: The compiler of this pillar of understanding is feeling just a little flabbergasted this month. Press reports of Government financial conditions contain such astronomical amounts of money that more than the usual mental grasp is needed to comprehend them. For instance this may help to explain just what is what. The President submitted a budget to congress for the governmental fiscal year beginning July 1, 1947. This budget **does not** include some important items such as various retirement payments to veterans. The total amount is reported to have been $37,500,000,000.00. Now in 1940, according to the census, there were 38,175,000 families in the United States. There are more now. But on the basis of the 1940 census the budget submitted to congress by the President amounted to $982.31 **for each family in the country.** Taking the population as shown by the 1940 census it amounted to $284.80 **for each individual.** I am not for or against the approval by congress of this budget but the above simple arithmetic served to bring the thing into mental range.

• • •

ALEXANDER GRAHAM BELL: It has been said, to paraphrase, that every institution is the expanded shadow of some individual. On March 3, 1847 in Edinburgh, Scotland, Alexander Graham Bell was born. In 1876 his patent on the telephone was allowed. From this beginning the modern communication facilities by means of the spoken word over the whole world has been developed. It is no distortion of the truth to say that life, in opportunity for accomplishment, has been lengthened and that distance, in many ways, has been eliminated. The modern telephone system is one of the important agencies of civilization. It affords an opportunity to many people of following careers for **achievement** and **service** and contributes to the enjoyment of life for many others. Not the least remarkable thing about it is the fact that this enormous expansion of an idea has occurred in the short space of seventy one years.

Q. How can you dig holes for transmission lines easily in frozen ground?

Q. How can you dig 20″ holes 7′ deep in less than 2 minutes in hard ground?

Q. How can a 2-man crew dig holes and set 45′ poles with the same piece of equipment?

Answer to all three: **USE THE HIGHWAY MODEL HD EARTH BORING MACHINE WITH WINCH AND DERRICK!**

OPERATORS tell us this amazing machine enables them to dig from 60 to 100 holes and set the poles in an average working day. They say they can complete new transmission lines in less than half the usual time, and can restore wrecked lines to revenue service in minimum time. This machine mounts easily in six square feet of platform space on light tractor or 1½ ton truck.

. . .

Other well-known Highway equipment includes line construction and maintenance bodies, pole and cable reel trailers, splicer's trailers, winches and power take-offs. Write us today about your immediate needs.

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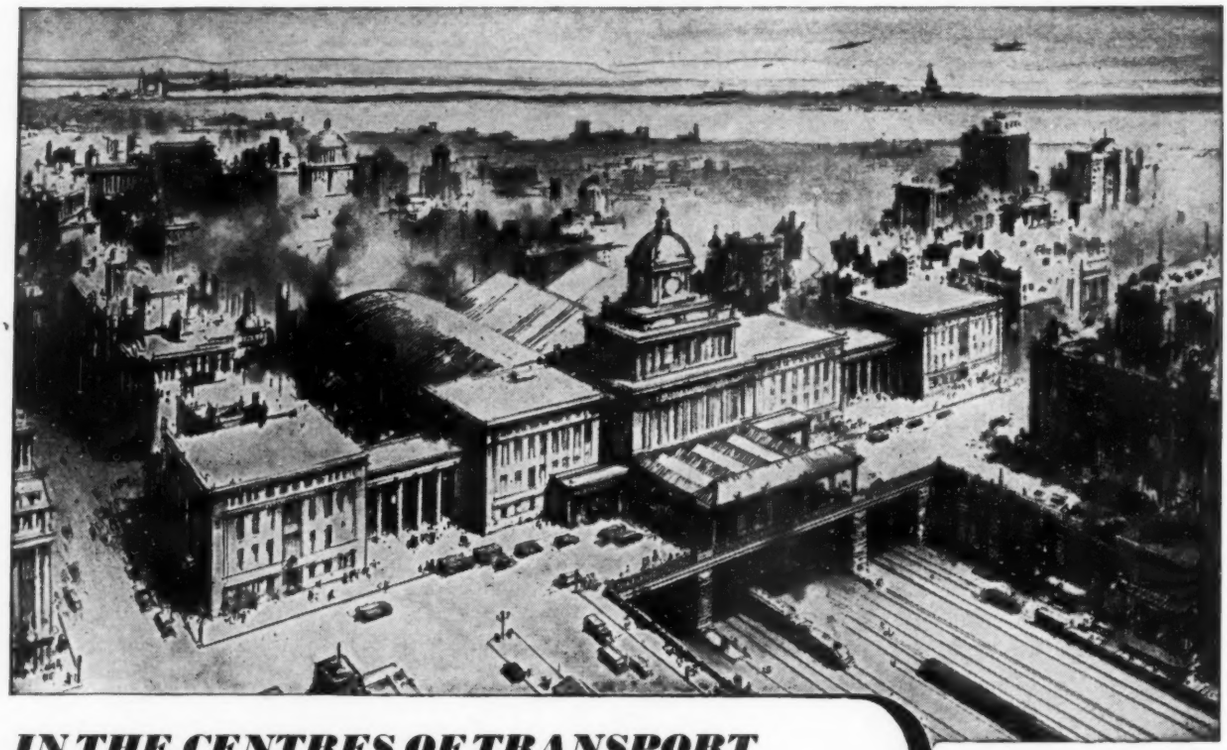
Manufacturers of: Utility Bodies • Winches • Earth Boring Machines • Pole and Cable Reel Trailers and other Public Utility Equipment.

General Offices: **EDGERTON, WISCONSIN, U.S.A.**

LINK THE WORLD'S RESOURCES - - -



IN THE CENTRES OF TRANSPORT

The conveyance of materials from one point to another was one of the earliest problems of mankind, hence one of the greatest inventions of all time, that of the wheel. Today the transport of passengers and freight is a major industry. To its administrators, dealing with distances and working constantly against time, the advantages of telephone communication are only too apparent. Where connections must be established over some distance through a series of intervening exchanges, Strowger Automatic Telephone equipment is available in a particularly appropriate form. The Strowger Impulse Regenerator enables automatic switching to be effected throughout multi-exchange areas for it receives and stores trains of dial-impulses, many of which may be distorted, and then transmits equivalent trains of perfect impulses.

THE IMPULSE REGENERATOR

has been developed because —

(a) the speed of the dial on a subscriber's telephone may vary between 8 and 12 impulses per second and the "break" period may be between 63% and 70% of the impulse.

(b) the line to line insulation of a subscriber's line may be as low as 50,000 ohms and its loop resistance 750 ohms.

(c) in result, the impulses become distorted before operating a selecting mechanism.

- *has therefore been designed to receive impulses before they become too distorted and retransmit them at the correct speed and ratio within narrow limits.*
- *has the facility of catering for any number of impulse repetitions; the loop and leak resistances in each stage can be of any value up to 2,000 ohms or as low as 50,000 ohms respectively.*

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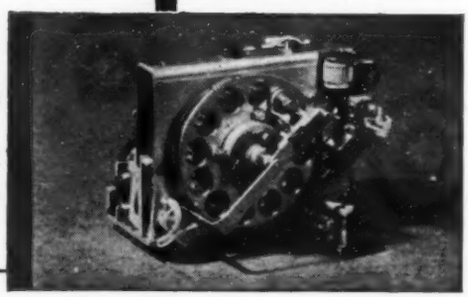

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Really A CENTRAL OFFICE *Institution!*

Calculagraph devices have for over half a century been used for obtaining the essential time date for billing toll calls.

This exceptional performance record, in telephone service throughout the world, attests its suitability for that exacting use.

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2-4 Dow Weed Killer

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Dow Contact Weed Killer

"Chemical Mower" for weeds along canals, ditch banks, fences and roads. Kills most annuals completely. Destroys all weeds and grass above ground, leaves roots to prevent soil erosion.

Economical and effective control of many stubborn, troublesome weeds along highways and rights of way is now possible through proper application of the right Dow Weed Killer!

Maintenance men everywhere are pleased when field crews report that *spraying* weeds to death is so *simple*—saves so much *time*—gets such excellent *results!* And when the cost figures come in—when the dollars and cents savings prove the economy of chemical weed control—that settles it! No more mowing, digging or hoeing—it's Dow Weed Killer for *better* weed control!

Results of many tests and successful applications are available for your inspection. The complete story of Dow Weed Killers is yours for the asking—without obligation. Consult your usual source of supply—or write to Dow direct. Get the facts!

Cut maintenance costs with—

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CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

"It Seems to Us"

When our ROY F. SMITH attended the Texas Telephone Association in San Antonio last week it marked the 48th year for one of the Smith family to report the doings of Texas or their telephone conventions. Transmitter magazine, which was merged with TELEPHONE ENGINEER in the 1930s, was founded in 1905 by the late J. A. SMITH, and served Southwestern telephony for over a quarter of a century.

●

We got a real bang out of the talk delivered by USITA president R. A. LUMPKIN at the recent Iowa convention. Dick pulled no punches in his discussion of national problems of the industry. He particularly discussed the effect of present labor laws on the telephone industry. If Mr. Lumpkin speaks at your state association convention we urge you to attend to hear him in person.

●

Pardon us while we do a little bragging. TELEPHONE ENGINEER & MANAGEMENT had in 1946 the highest paid circulation ever reached by any telephone publication on this Continent. (This is why we run short of paper now and then). We hasten to add that we are not content to rest on these laurels but must go on from there. We want to make the TELEPHONE ENGINEER publications better and better and our Editorial Staff has a number of new features already in the works.

●

BILL McCLUSKY, gen. mgr. and plant sup't. of the Citizens Telephone Co., Rock Creek, O., is expecting his company to step up to a Class C company this year. Every member of Bill's family are operating telephone folks and have demonstrated what can be done when they all pull together.

●

The world on March 3, 1947, honored the one hundredth anniversary of the birth of ALEXANDER GRAHAM BELL—joined in honoring the memory of a man who left lasting footprints in the sands of time.

Dr. Bell was intensely interested in many things during his 75 years of life. He was a man of tremendous and driving energy and enthusiasm in his earlier years, and tireless and persistent throughout life. With a deep and kindly interest in his fellow man, he contributed much to humanity—particularly to the deaf. His invention of the telephone has of course shaped the face of modern life. Bell was one of the world's versatile geniuses.

Telephone ENGINEER and MANAGEMENT

THE NATIONAL TELEPHONE MAGAZINE

Volume 51 Number 3 Since 1909 March, 1947

Contents

Jay G. Mitchell's Commentary 5

Editorial 19

News Briefs..... 25

Automatic-Type Battery Chargers Insure Long Battery Life..... 26
By John S. Reed

Ingenuity of Telephone Industry Whipping Held Order Situation..... 29
By John G. Reynolds

Employee-Employer Relationship 31
By Virginia Dull

Washington Reports..... 33
By Roland C. Davies

Modern Testing Methods 35
By B. C. Burden

Management Quickie..... 37

Courts & Commissions.... 40

New Products..... 44

Line & Desk..... 61
By J. S. Reed

Coming Conventions..... 72

Clearing House 78

Index To Advertisers 81

The Back of The Book 82
By John G. Reynolds

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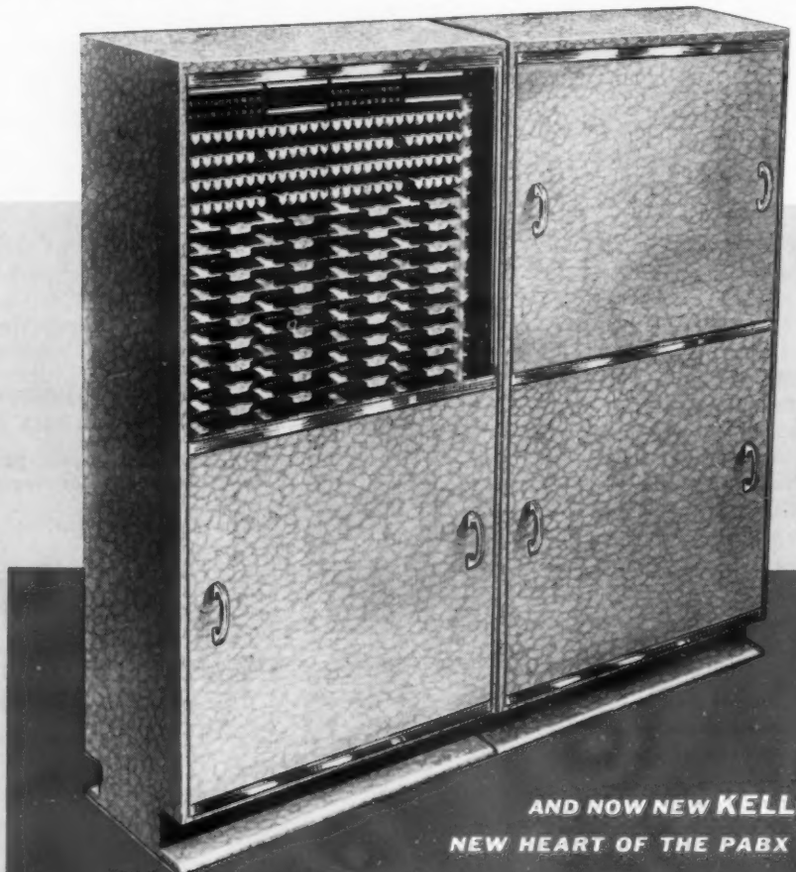
Right through your window . . . throughout your community . . . you can see scores of prospects for Kellogg PABX Switchboards. They're the plants, business houses and institutions that dot your exchange area—organizations that are always looking for new ways to increase operating efficiency.

Go after this new source of extra revenue and profits for you. Show these establishments how to step up efficiency all along the line by pointing out the advantages of a private automatic branch exchange. Tell them that a Kellogg PABX saves time and work for employees and executives alike . . . speeds information to customers . . . permits private conversations . . . assures better general supervision . . . will deliver years of trouble-free service.

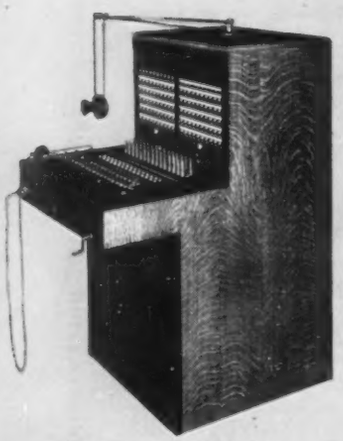
You can promise these benefits with complete confidence that the Kellogg PABX will more than "measure up." It's engineered and built to Kellogg's higher standards—embodies the finest in craftsmanship and materials. Installation anywhere is easy, speedy and low-cost. And because the Kellogg PABX Switchboard can pay for itself in a few years . . . because it can be depended on for long and satisfactory service with minimum maintenance . . . you can depend on years of extra income.

Yes, opportunities galore to increase your revenue are right in your own "front yard"—in the factories, stores, hotels, banks, hospitals, within your scope of operation. Make the most of these extra money-making possibilities. Make a point of asking your Kellogg representative for full information on Kellogg PABX Switchboards . . . today.

KELLOGG SWITCHBOARD & SUPPLY CO.
6650 SOUTH CICERO AVENUE, CHICAGO 38, ILLINOIS



Kellogg PABX 100-Line Switchboard. Recommended for up to 100 lines, 10 trunks. Accommodates a maximum of 15 links.



Cord-Type Attendant's Cabinet for use with Kellogg PABX (where preferable, turret type attendant's cabinet may be used).

AND NOW NEW KELLOGG *RELAYS...*
NEW HEART OF THE PABX

Efficiency of a dial switchboard depends largely on its relays—and Kellogg relays have always been built right. Now Kellogg offers new improvements, which have been developed, tried and proved in the past few years—improvements which further assure the superiority of Kellogg relays. These new developments have, among other things, reduced the size of the multiple contact relay by about 35%. This space-saving compactness—their twin contacts of precious metals on special nickel silver springs—combine to assure maximum operating dependability on every count. Failures are virtually eliminated in Kellogg relays. Maintenance is held to the lowest possible minimum. Their use in the Kellogg PABX is your assurance of the finest service over the longest period

YOUR OWN "FRONT YARD"

LOOK OVER THIS PARTIAL LIST OF KELLOGG PABX FEATURES . . .

TWO OR THREE-DIGIT DIALING—Two or Three-digit number can be assigned to each local telephone, depending on size of board and features desired.

CODE CALL AND SIGNAL—Automatic code call service permits any station or attendant to set up a paging signal—answerable from any telephone in the system by dialing special answering number.

SECRET SERVICE—Conversations are private, as no one can cut in on a busy line, except when equipped for executive right of way.

RESTRICTED SERVICE—Can be wired to prevent switching through of link when special service digits are dialed.

CONFERENCE SERVICE—Various arrangements allow uninterrupted group telephone conferences.

NIGHT SERVICE—Night switching key can be set in position to permit trunk calls to come in on local line.

REPEATED DIALING—Supervisory relay follows dial impulses and repeats them to the dial main exchange.

POWER—Can be operated from standard 24-cell storage battery or a suitable battery eliminator.

TELEPHONES—Kellogg MASTERPHONES or any standard dial telephones can be used.

SIMPLE INSTALLATION—Wired, connected and tested at the factory—cabinet contains terminals for all line, power and signal connections.

RUGGED CONSTRUCTION—All equipment supported by rigid welded iron framework and housed in a sturdy all-metal cabinet.

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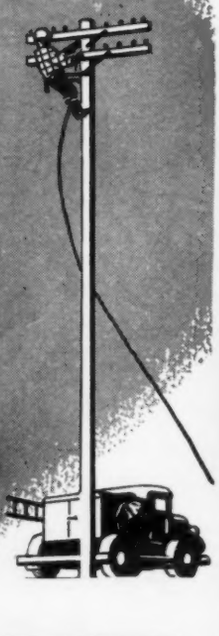
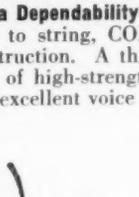


Extra Dependability Plus Low Cost. Light in weight, small in diameter and easy to string, COPPERWELD is the ideal wire for long-life, long-span construction. A thick covering of copper *permanently* molten-welded to a core of high-strength alloy steel prevents rust—provides high conductivity and excellent voice and high frequency transmission characteristics.

Meet Every Service Need. No matter what your requirements, there is a size and style of Armstrong's Glass Insulator to meet it. Made by ARMSTRONG CORK COMPANY, they feature crystal clarity of glass, accurate gaging, and unusual resistance to temperature changes. For lower maintenance costs, always specify and use Armstrong Glass Insulators.



There's three-way satisfaction when you concentrate purchases of line supply and construction materials at a single, responsible source: (1) The *quality* is right—all products are backed by the famous Kellogg DOUBLE GUARANTEE; (2) The service is right—orders are intelligently handled by experienced people; (3) *Delivery* is right—orders are shipped from the nearest of over 50 strategically located distribution points.

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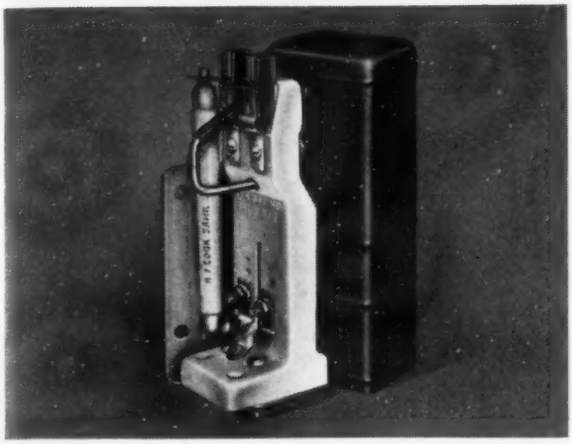
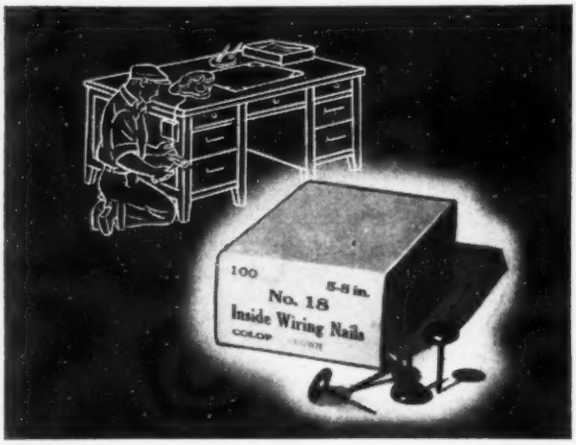


Built to "Take It"! THE COOK ELECTRIC CO. "O" Type single circuit Substation Protector is equipped with fuses and high potential non-grounding discharges. It's water-proof and fireproof for installation indoors or out. There is a Cook "O" Type Protector to fit all your needs.



It's a Snap to make neat installations with Rhodes Telephone Wiring Nails according to telephone men who use them exclusively. M. M. RHODES & SONS maintain the uniform high quality of these nails by putting them through rigid driving, withdrawing, bending and immersion tests.

1 Spray Proof Vent Chambers. 2 High Acid Space. 3 Floté Plates. 4 Built-in Charge Indicators. 5 Hard Rubber Retainers. 6 Quarter-Sawed Douglas Fir Separators. 7 Super Braced Corner and Side Locks. 8. Supported Elements. 9 Steel Glass Jar (½ inch thick).
1
2
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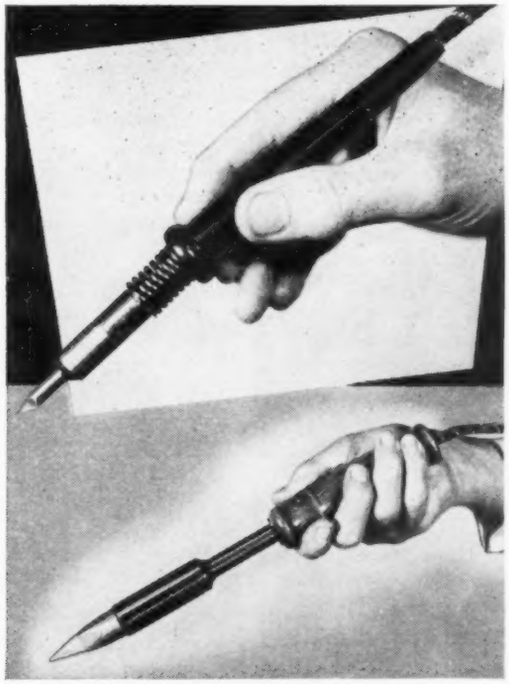
9

Modernize with Philco. For the latest in modern telephone battery design many engineers specify PHILCO Floté. Built into this battery are all the modern engineering features needed for today's full float service. In addition, every Philco Telephone Battery has the famous Floté grid that eliminates low cells, and measurably contributes to operating efficiency, longer battery life and lower costs.

Not A Kink in a Carload. Kellogg Koiled Kords always stay out of the way and thus help reduce telephone breakage caused by dangling cords. The outer rubber cover is permanently molded in spiral shape, thus assuring uniform retractability and long life.

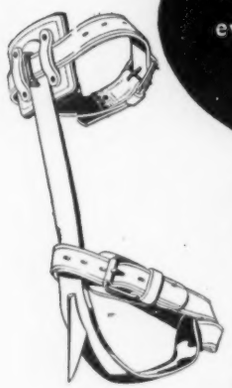


Neat Precision Soldering is easy when you use a Vulcan Electric Soldering Iron. Made by VULCAN ELECTRIC CO., these irons give unimpaired heat production, last longer. They come in 15 sizes of screw tip and plug tip types—including the "Pygmy" tool for delicate soldering in cramped spaces.

Save Three Ways . . . on materials, man-hours, and maintenance, with INDIANA STEEL & WIRE'S Crapo HTL-85 and HTL-135 Line Wire. Galvanized by the famous Crapo Galvanizing Process, it's protected with a heavy, ductile, tightly-adherent coating of zinc.

Here's
WHERE QUALITY REALLY COUNTS!

When you're up on that pole, Mister, quality and comfort mean everything! Just ordinary equipment isn't good enough. It must be the best!



❶ That's why the famous STEPHENS CLIMBERS are in such demand by power companies, telephone companies, and individual linemen. Manufactured exclusively by Buckingham of Binghamton for nearly 50 years, *Stephens Climbers*, like all Buckingham linemen's equipment, use only the finest materials, to conform with the highest safety standards.

❷ Buckingham No. 56-R Floating *Tool Belt* is made of tan color harness leather and lined with soft chrome lace leather. No metal contacts the body. The "floating" feature insures full-open tool loops under all working conditions. An additional feature is the resilient, rubberized wool body padding, for extra comfort and ease.

❸ Here's another example of Buckingham quality — where quality really counts! Buckingham *Safety Straps* — made by workmen who recognize the responsibility that each belt carries with it.

Immediate DELIVERY on all Buckingham Equipment

Buckingham

Walter E. Craw, President

MANUFACTURING CO., INC.

5-7 Travis St., Binghamton, N. Y.

"Order from your telephone supply dealer"

ON OUR PARTY LINE

•

TELEPHONES MADE THEM NERVOUS...

WHEN the telephone was first produced in business, the older and more responsible members of business houses often made all manner of excuses for passing the use of the instrument to their subordinates. The following excerpt from an article in *The Electrical Engineer* of May, 1892, discusses the problem of educating business leaders in the use of the telephone.

"Considerable difficulty was experienced in doing this as many people on the first occasion of using the telephone persist in saying that they can hear nothing and working themselves into such a nervous state that in a short time they can say nothing either. . . . It was no easy task to convince heads of firms that they really could use the telephone themselves with perfectly satisfactory results, but the 'Long Distance' Company succeeded in doing it and its patrons have become so finely educated in the manipulation of the transmitter and receiver that they conduct their telephone interviews in the most business-like and matter-of-fact manner."

• • •

"NO LUNCH AT THE BOARD . . ."

AN OLD timer writes to comment on John Boylan's "Tales of The 90's" series, and also pass on a fund of reminiscences about the "horse-and-buggy" days of long distance telephoning.

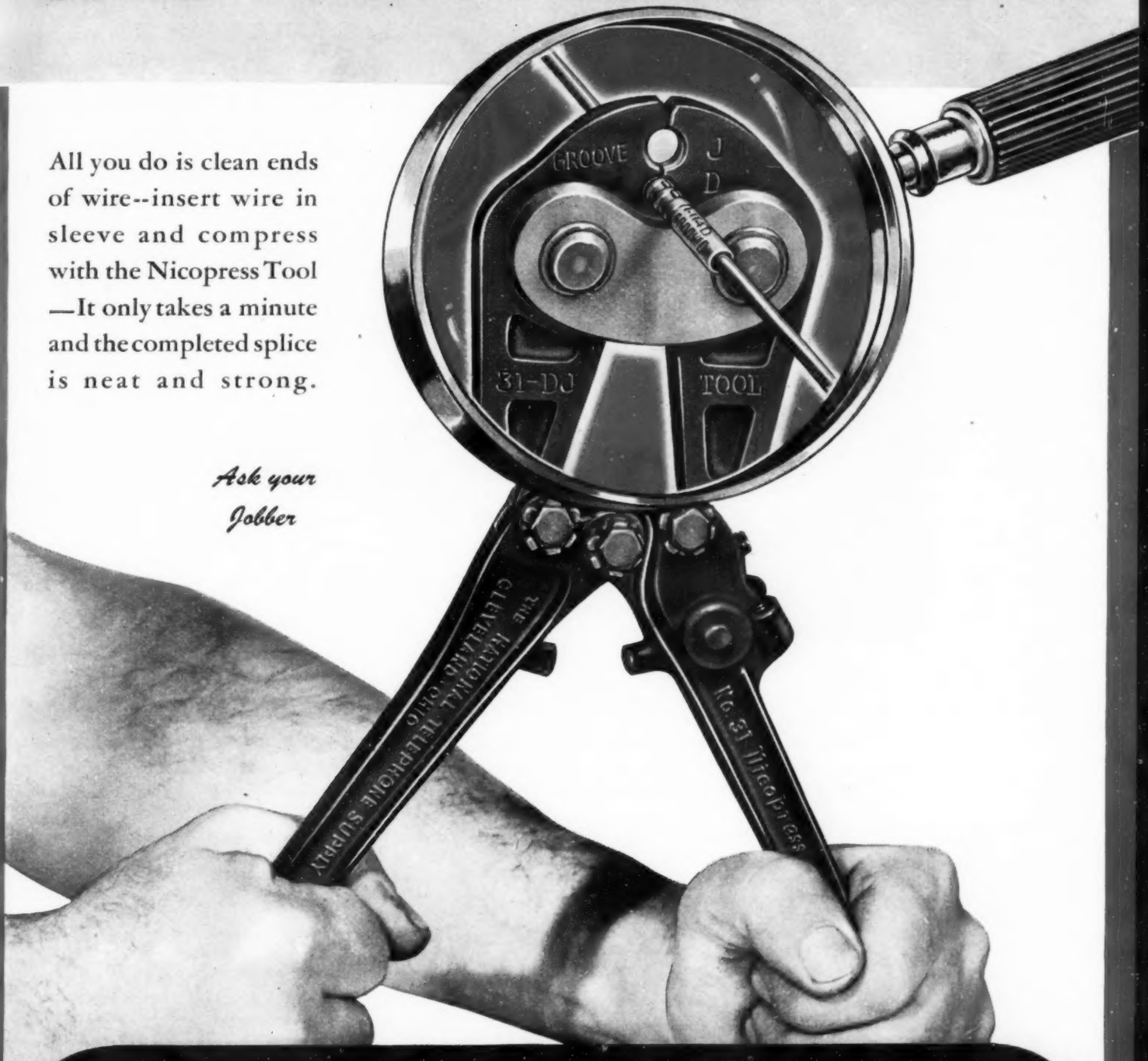
"In the 90's," he writes, "when women's skirts were worn to the ankles, when automobiles were an innovation and tandem bicycle riding was a favorite pastime, a telephone call between New York and Chicago was the longest that could be made. Those, too, were the days when men operators replaced the women for the night shift, and the rulebook cautioned operators against *reading letters, books, papers and eating lunch at the switchboards.*"

• • •

"BABY TELEPHONE LINE"

IN Prairie Queen, Minnesota, we hear there is a small Independent known as The Baby Telephone Line.

THE *Nicopress* SLEEVE AND THE NICOPRESS TOOL GIVE YOU A PERFECT SPLICE



All you do is clean ends of wire--insert wire in sleeve and compress with the Nicopress Tool —It only takes a minute and the completed splice is neat and strong.

Ask your Jobber

The National Telephone Supply Company

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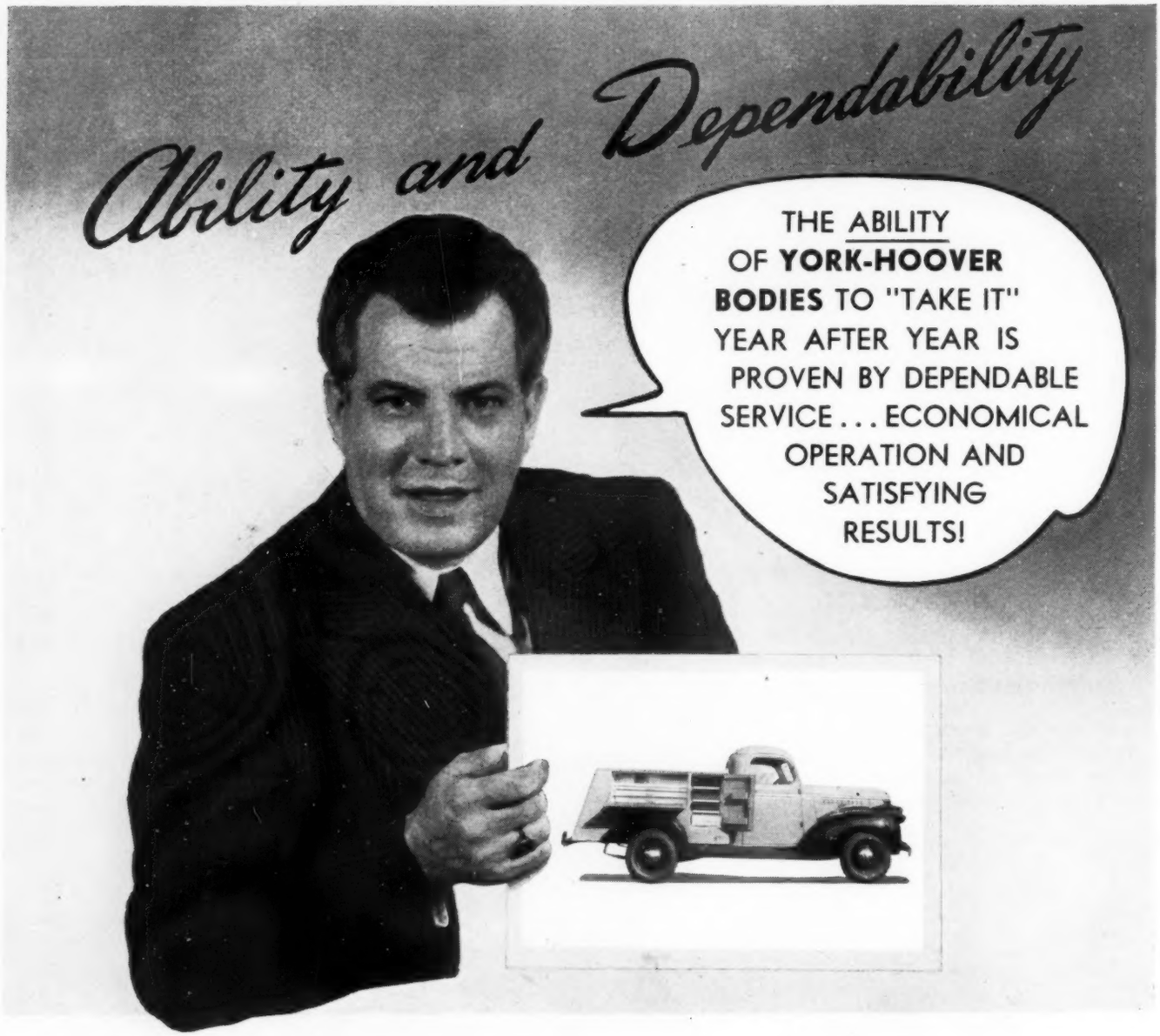
Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

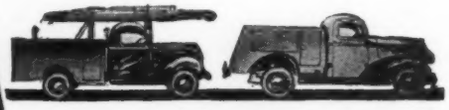
THE NATIONAL TELEPHONE SUPPLY COMPANY

Ability and Dependability



For over 55 years sound engineering and skilled craftsmanship have been the basic factors contributing to the reliable performance of York-Hoover bodies . . . factors, too, that have earned and maintained the valued confidence of our good friends and customers.

YORK-HOOVER CORPORATION



BODY DIVISION **YORK, PENNSYLVANIA**

EDITORIAL

A Question of Who Is Entitled to What

The Telephone Committee of the National Association of Railroad and Utility Commissioners is engaged in an investigation to determine whether the present division of telephone toll revenues between the Long Lines Department of the American Telephone And Telegraph Company and the various Associated Bell Companies is correct. The principal question involved, and the question which brought about the investigation, is that of whether the Associated Bell companies should not receive a larger proportion of the Long Lines revenues than they now receive.

The question arises from the fact that, according to the calculations of the Federal Communication Commission, the A. T. & T. Long Lines are earning more than a fair return—plus the fact that many of the Associated Bell Companies are earning less than a fair return.

The investigation is on an entirely amicable basis, with A. T. & T. and F. C. C. cooperating with the N. A. R. U. C. Telephone Committee. The Committee has raised funds from state commissions for the investigation, has employed expert technical assistance, and is going about the proposition in a businesslike way. All of the state commissions are said to be in favor of the investigation, and assisting it in such ways as they can.

The investigation, started late in February, is expected to be concluded before May 1st. Meanwhile, it is reported, there will be no further immediate proceedings by F. C. C. with respect to a reduction of present Long Line interstate toll rates.

This question of "who gets what" out of telephone toll revenues when more than one company participates in the handling of a message, has long been one of the complex questions of the telephone industry. Only a few years ago long and extensive hearings were held by F. C. C. on only one phase of the matter, namely, whether the division of tolls should be made on the "board-to-board" or on the "station-to-station" basis. That the findings in that case did not settle the matter of divisions for good and all is shown by the fact that the present investigation is in progress.

Since that "separation" case was decided a few years ago, many things have happened—some of which have undoubtedly had effect on the present fairness of the divisions of tolls determined upon at that time. For one thing, the expense of operating toll messages—of originating them, terminating them, billing them, etc.—has gone up heavily, and probably more rapidly than the cost of maintaining toll lines. It is, we think, a good thing to ascertain on the basis of present-day facts what a fair and proper division is today.

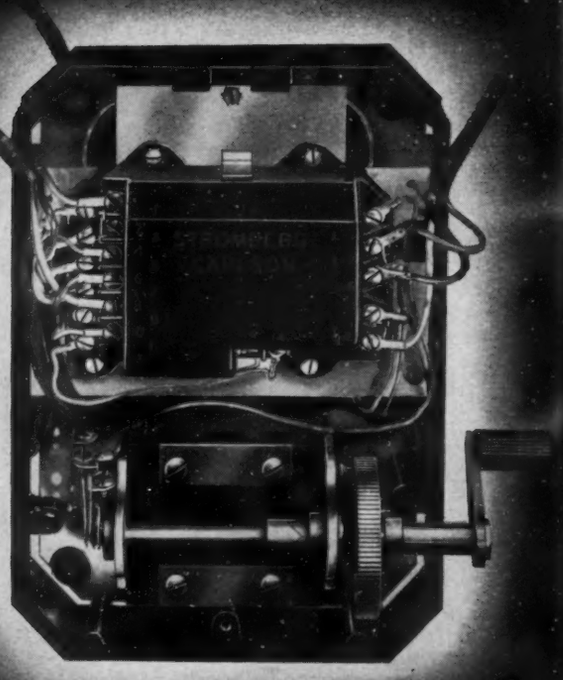
We understand that it has been stated by the N. A. R. U. C. Telephone Committee that the present investigation has no bearing on the division of tolls as between Bell and Independent companies—that it is solely a question of the propriety of the present division as between the Bell Long Lines and Bell Associated companies.

We do not question the Committee's intentions, but if the Committee finds—as it may—that in principle, on the basis of present-day facts, the Associated Bell companies are entitled to a larger proportion of Long Lines revenues, then we do not see how the regulatory commissions can avoid applying the same principles to divisions of tolls between Bell Associated companies and Independent companies—which would result in Independent companies being entitled to a larger division from joint Bell and Independent toll revenues.

As a matter of fact, and notwithstanding adjustments that have been made from time to time, Independent companies have never been satisfied that they receive the full division of joint Bell-Independent tolls to which they are entitled.

. . . every magneto

No. 1248—compact, streamlined, complete; "All-in-one" modern desk set.



(Open view)
Interchangeable base illustrates compactness of internal design. Push-buttons for grounded ringing, illustrated on desk set and wall instrument, are optional equipment. Telephones are easily converted for common battery or dial use.

No. 1258—attractive cradle-type wall telephone in gleaming black plastic case.

No. 1268—desk set box harmonizes in appearance with telephone instruments.

to feature you have ever wanted!

THE new STROMBERG-CARLSON MAGNETO TELEPHONES

In appearance, efficiency, adaptability and long life, the new Stromberg-Carlson Magneto Telephones offer everything you would expect from one of the industry's oldest, most experienced companies.

Modern styling meets with instant subscriber approval.

Base assemblies for the three instruments are interchangeable for service economy.

High-powered, compact Alnico 5 generator reduces bulk, permits streamlined design.

For details of these and many other quality features that must be seen to be appreciated, contact your Stromberg-Carlson representative.

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Supplementing its own production, engineering and service facilities, Autelco Mediterranea is privileged to draw upon the background of half a century of development, design and manufacturing experience possessed by other companies of the Automatic Electric group. Thus, in Italy—as throughout the world—the entire facilities and resources of International AUTOMATIC ELECTRIC Corporation can be brought to bear upon any problem encountered in providing telephone communications.

It is this complete service which we offer you, wherever you may be. Look to International AUTOMATIC ELECTRIC for the finest of telephone equipment, and for the services of an organization which is world-wide in scope, with broad experience in every phase of telephone operations.

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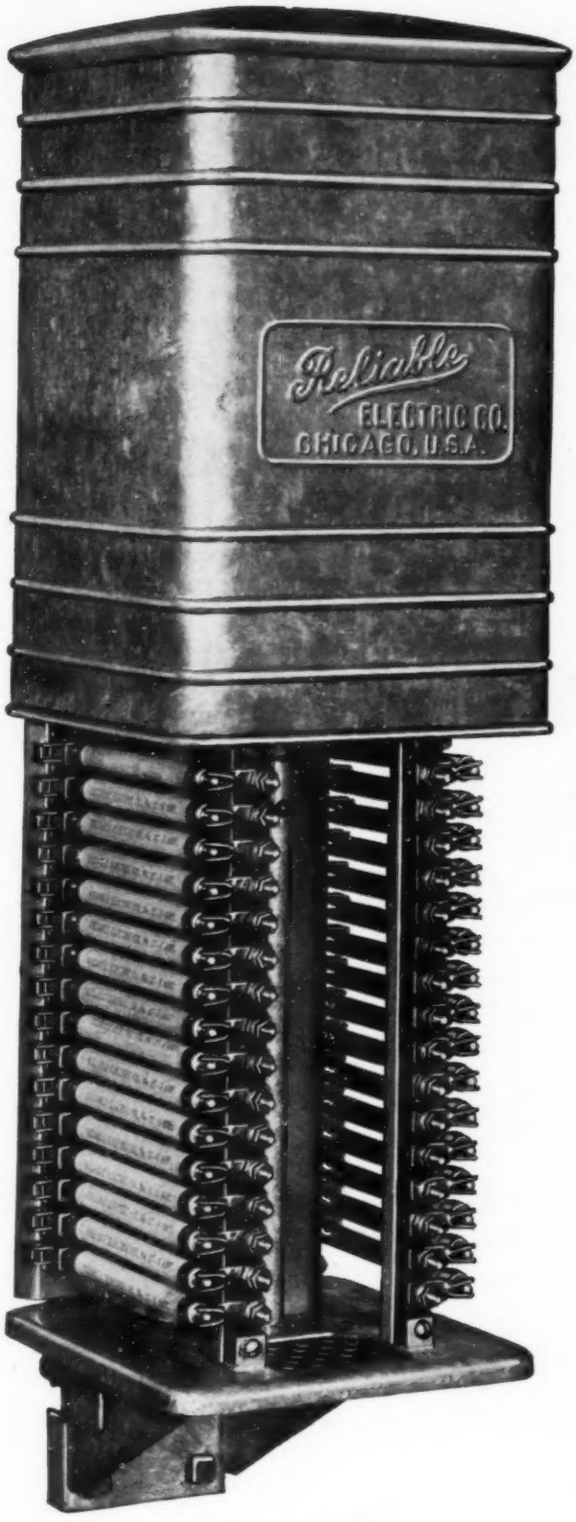

re-li´able, (re-li´a-bl) *adj.*
Suitable to be relied on,
trustworthy.
...Webster

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Specify Reliable

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CABLE TERMINAL

Your linemen know!

BECAUSE...

Their experience has *proven* that the B-27 Cable Terminal far exceeds field engineering requirements. Easy accessibility simplifies and speeds installation, inspection and maintenance. Savings in time and labor alone put the B-27 in a class by itself. Its dependable, long-lived service has set a new standard of operation throughout the industry.

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"Up in the Air" or "Down Under"

GENERAL CABLE
Quality Pays

● Whether your plans call for aerial or for underground installation, you can count on General Cable quality and workmanship to reduce repairs to a minimum. General Cable's wide line assures you of just the right cable for your specific need—a cable that is durable and practically trouble-free.

Backed by a half-century of experience, the finest of materials, and craftsmen working with the most modern machines, General Cable offers you the best in quality and service.

General Cable can be supplied for any aerial or underground requirement; so when you buy cable, be sure you get the protection of General Cable quality. Turn to your big Automatic Electric catalog for complete cable specifications and ordering information.

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NEWS BRIEFS

Brooklyn, Mich., Company Approve Reorganization Plan

Subscribers to the Brooklyn (Mich.) Switchboard Association, at their recent annual meeting, approved a plan of reorganization and modernization of the telephone service in that area. The new board, proceeding on this plan, will now incorporate the Switchboard Association into a joint stock company and take over the ownership and the responsibility of repair and maintainance of the rural lines.

All of the physical telephone properties in the area will be taken over by the new company. Present manual switchboard capacity will be doubled until automatic equipment is installed. New board consists of: Ross M. Brown, president; Ralph Donaldson, vice-president; Paul Ryer, treasurer; Mrs. Clyde Spring, secretary; E. J. O'Rourke and Milton Wheaton.

◆

Minnesota Association President Uses Exchange For Broadcast

Chas. R. Cashel, manager of the Worthington (Minn.) Telephone Exchange, recently came to the rescue of E. B. Miller, Minnesota State Legion commander, who was among those marooned in southwestern Minnesota during a heavy snow storm. Mr. Miller was stopped by the storm in Worthington when he was supposed to be broadcasting from a Brainerd radio studio.

However, the broadcast went on just the same,—the only hitch being that Mr. Miller was four seconds late in getting on the air.

From 7:45 to 8 p.m., Mr. Miller talked over the facilities of the Brainerd station by direct wire from the Worthington Telephone Exchange company building where the office of manager Cashel was converted into an impromptu broadcasting studio.

Because regular equipment was too powerful for a broadcasting hookup, the local telephone crew had to make a special magneto telephone hookup in the Cashel office, from which the address went by direct wire to Minneapolis and from Minneapolis out to Brainerd over another circuit.

◆

WHAT THEY'RE SAYING...

Fred Taylor
Birmingham (Ala.) News

"It's a safe bet that car phones, although introduced in Birmingham only a couple of days ago, are here to stay.

"Of course, they have been in use for some time in larger cities and indications are this mobile radio-phone service inaugurated for urban areas by the Southern Bell Telephone & Telegraph Company will be rapidly expanded.

Already applications are pouring in. The Alabama Power Company, which started out with phones in three of its cars, plans to have sets installed in 15 more vehicles. Its advantages are obvious. Repairmen and other employes can keep in constant touch with their office while out on a job. These two-way phones will soon become standard equipment for ambulances, newspapers, radio stations and various business concerns."

●

Editor,
Jackson (Miss.) News

"There seems to be ample statistical support for the petition of the Southern Bell Telephone & Telegraph Company asking the Public Service Commission for permission to make a 12½ per cent rate increase in Mississippi.

"While a few folks may think contrariwise, the value of a local telephone service depends on the number of subscribers it reaches, just as the subscription list of a newspaper governs its advertising rates.

"It is quite evident that the company cannot meet the demand for expansion of its service without additional revenue and no doubt the Public Service Commission will look at it in that light after all the facts are fully presented."

Kinsman (Ill.) Group Organizes Telephone System

The village of Kinsman, Ill., will soon have its own telephone system. The system, which has not been in use for several years, has been revived with issuance of articles of incorporation to the Kinsman Mutual Telephone Company.

The incorporators are C. E. Troxel, Joseph Lowery, Francis Dunn, all of Kinsman and the life of the company is said to be perpetual. The directors include C. E. Troxel, Joseph Lowery, Francis Dunn, Edmund Harty, A. P. Meagher, Roy Walsh and John R. Dunn.

According to incorporation papers the purpose of the company is not to operate for profit and shall render no service to or for the public but shall be for the private use of its members.

Kinsman has been without a public telephone service for some years and the only way to get anyone in the village is through the only phone installed in the village store.

◆

Kentucky Association Convention

D. H. Lloyd, secretary-treasurer Kentucky Independent Telephone Association has announced that the association will hold a one day convention on March 26, 1947 at the Brown Hotel, Louisville, Kentucky.

◆

Stock Sale Approved

The Indiana Public Service Commission has granted the Citizens Telephone Corp., Warren, authority to buy common stock of the Liberty Center (Ind.) Telephone Co.

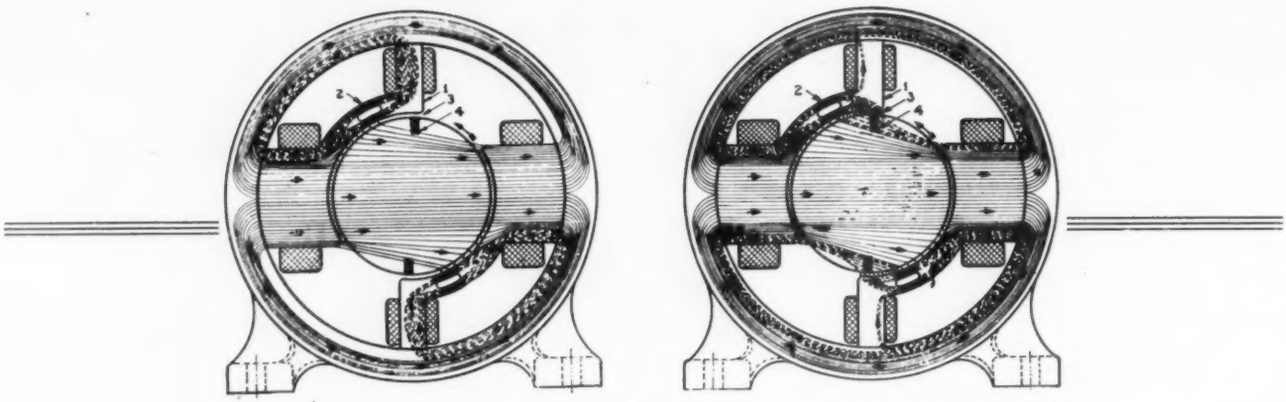

Fig. 1—Showing magnetic shunt connecting main pole and interpole in diverter pole generator. Left illustration shows magnetic flux distribution at no load, and right illustration, the flux distribution at full load.

Automatic-Type Battery Chargers Insure Longer BATTERY LIFE

By JOHN S. REED, JR.

THE SATISFACTORY operation the central office battery depends on the ability of the office charging equipment to bear the major portion of the exchange load without overcharging or undercharging the battery. The longest possible life is assured when the battery is maintained in a fully charged condition at all times. In this state, the battery is ready to furnish power at peak current demands beyond the ability of the charger to supply, and to provide emergency power in case of an interruption of the commercial power supply.

At the same time, the charging equipment must hold the output voltage of the battery as nearly as possible to a constant value. This is important for the stable operation of relay equipment, long life of switchboard and indicator lamps, and satisfactory voice transmission.

High battery voltage causes excessive arcing at relay contacts and tends to make the relays release in a sluggish manner. On the other hand, a low voltage condition will cause relays to pull up more slowly or possibly fail to operate. Fluctuations of the battery voltage between excessively high and low values make it difficult to keep relays properly adjusted.

AUTOMATIC chargers, aside from prolonging battery life and providing constant voltage output of the battery, makes possible much less attention of the central office battery than when a non-automatic charger is utilized. This timely discussion of types of charging equipment having the necessary features that enable them to maintain a constant battery output voltage and prolong life of central office batteries will be of value to every telephone manager seeking to lower operating costs and improve service.

Excessively high battery voltage will cause switchboard and indicator lamps to burn out in a short time, necessitating their frequent replacement.

Although variations of battery voltage affect the transmission qualities of telephone circuits to some extent, a more serious result is the influence of high battery voltage on the operation of transmitters. Transmitters become noisy if they are subjected to an excessively high voltage, which is especially the case if they are in short subscriber's loops. Such transmitters suffer permanent damage and must be replaced.

This article discusses types of charging equipment having the necessary features that enable them to maintain a constant battery output voltage and prolong the life of central office batteries.

Direct Current Generators For Charging Batteries

ORIGINALLY, charging equipment installed to charge a central office battery consisted of a direct current generator to furnish the charging current, together with accessory equipment to manually regulate the current supplied to the battery. When the battery was fully charged as determined by the specific gravity readings and the gassing state of the battery, the charging

equipment was disconnected. The battery was then allowed to discharge into the exchange load until a minimum point was reached in the specific gravity reading. The generator was restarted and the charging process resumed. This operation was repeated as often as necessary to bring the battery voltage back to normal.

Later, end cells and counter E.M.F. cells were added to the central office battery to keep the total voltage as nearly at its normal value as possible. This called for the constant attention

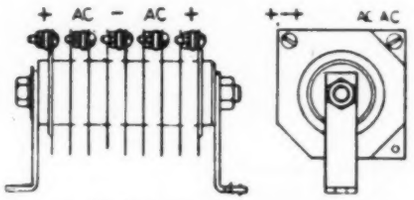

Fig. 2—Typical appearance of copper-oxide dry-disc rectifier.

of central office employees to the operation of the charging equipment.

Improvements in generator design and the use of adequate filters to eliminate commutator ripple and other generator noises made it possible to leave the generator connected across the battery in an operation known as the *continuous float* method. This enabled the generator to carry the entire discharge load most of the time. The battery was thus kept fully charged, ready to take its share of the load during peak current demands beyond the capacity of the generator. The output was manually controlled at half-hour or hourly intervals to maintain the average voltage per cell at 2.15 volts.

The continuous float method and its modifications are still in use in many large exchanges. In many cases, a mercury vapor rectifier tube is employed instead of the direct current generator for rectifying commercial alternating current for charging the battery.

Diverter Pole Generator

VARIOUS methods have been devised to make the necessary adjustments of the battery voltage

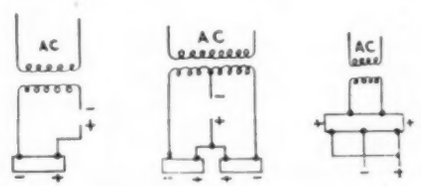

Fig. 3—Various rectifier combinations commonly used. Left—half wave rectifier. Center—full wave rectifier, center tapped secondary. Right, full-wave rect'fier, bridge type.

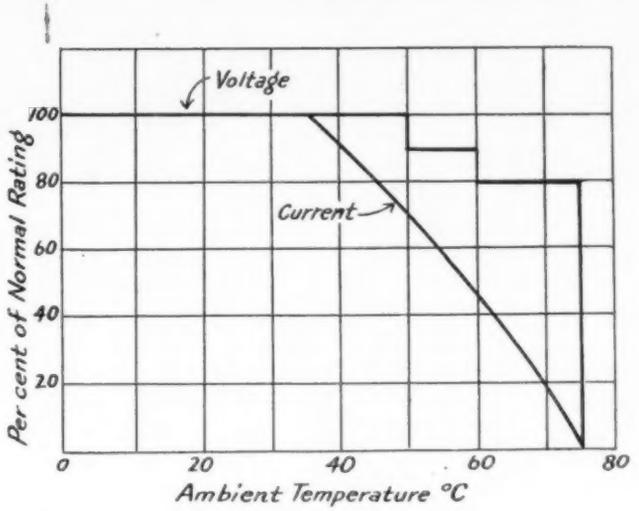

Fig. 4—Per cent reduction required in output rating at temperatures over 35° C (95° F) for General Electric selenium rectifier stacks.

automatic. In the case of charging generators, an ingenious method of automatically regulating the output in step with changes in the load is utilized in the *diverter pole generator*.

This type of generator has interpoles between the main poles, each interpole being bridged to its associated main pole by a magnetic shunt as shown in Figure 1. At no load, part of the magnetic flux due to the shunt winding on the main pole is shunted through the bridge to the interpole and does not pass through the armature. When the load increases, the series winding on the interpole causes a certain amount of flux in the interpole to pass through the armature so that the current output is increased.

Correct proportioning of the shunt and series windings results in the flux through the armature varying with the load. The generator supplies the major portion of the load, keeps the battery fully charged at a practically constant voltage, and is capable of charging the battery at a high rate after an overnight shutdown until the battery has regained its normal voltage. In case of overloads, as on peak demands, its characteristic is such as to permit the battery to supply the additional current beyond its rated capacity.

Rectifier Units For Small Chargers

IN SMALL and medium sized exchanges, smaller and less elaborate chargers are entirely adequate for charging the central office battery. Also in the larger offices, low capacity chargers are often employed to charge the battery at a trickle rate during periods of light demand. The regular charging equipment is shut down during these periods to save power.

Low capacity chargers make use of rectifying units such as tungar bulbs and copper-oxide or selenium dry-disc rectifiers. Tungar bulbs used in tungar chargers are filled with argon at a pressure of about 1-10 atmosphere. A heated filament throws off electrons which are attracted to a graphite anode in the top of the bulb.

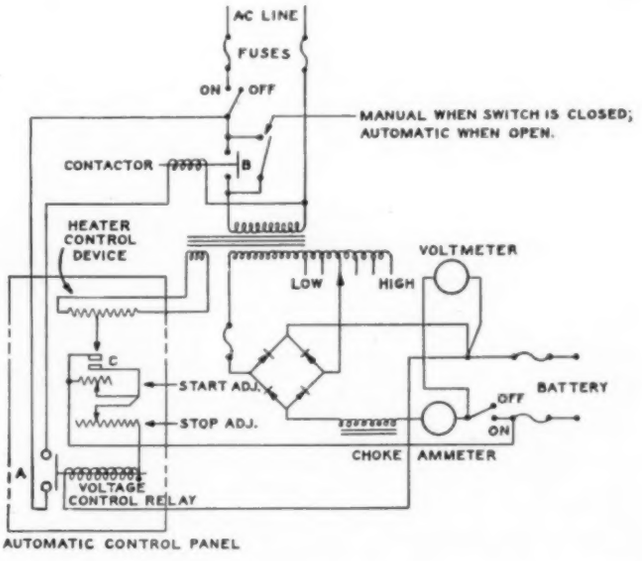

Fig. 5 — Circuit diagram of General Electric automatic battery charger.

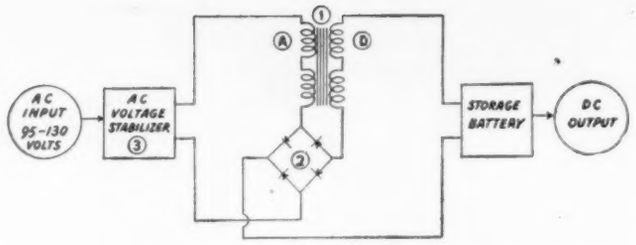

Fig. 6 — Schematic diagram of the Recti-ChargeR.

The electrons flow only when the graphite is positive; hence this unit is capable of rectifying alternating current to a pulsating direct current. The rating of chargers using this type of rectifier varies from 0.5 to 12 amperes. The full load efficiency is about 28 per cent for the smallest size and 74 per cent for the largest size.

Dry-Disc Rectifiers

DRY-DISC rectifiers of the copper-oxide type make use of copper discs that have been heat treated and quenched to form a layer of cuprous (red) oxide on one side of the metallic disc. The junction between the metallic copper and the red oxide has the property of allowing current to flow readily from the oxide to the copper, but not in the reverse direction. To make up a complete unit, a number of the discs are assembled on a single insulated bolt with lead washers between the discs to provide a contact surface for the red oxide coating. Radiating fins and spacer washers are used in the larger sizes of rectifier units to dissipate the heat more rapidly.

Various combinations of the discs are made up for different ratings. Figure 2 illustrates a typical dry disc rectifier unit of the copper-oxide type and Figure 3 diagrams the various combinations that are commonly used.

Selenium rectifier units are made up of carrier plates formed from aluminum or iron and having on one side a thin coating of crystalline selenium covered with a layer of low melting-point alloy. This layer is called the counter electrode. Current passes readily from the metal plate through the selenium to the counter electrode but is effectively barred from passing through when it changes its direction of flow.

The selenium rectifier is built up in stacks in the same manner as copper-oxide units, except that no radiating fins are utilized. Instead, sufficient space is provided between the discs for adequate ventilation.

All dry-disc rectifier units are subject to aging, partly as the result of contact resistance and partly due to internal changes, which causes a decrease in the output of the rectifier. The aging effect is most pronounced in the first three or four months of service and tapers off till no further change can be detected at the end of two or three years. This decrease in current capacity does not amount to more than 25 per cent of the rated output and is always allowed for by the manufacturer.

The dry-disc rectifier functions most efficiently if it is not allowed to exceed its name-plate rating, or if it is not subjected to surrounding temperatures greater than recommended by the manufacturer. If it is necessary to increase the temperature limits, the rectifier must be operated at a lower voltage and current rating. For example, in the case of General Electric selenium rectifier stacks, the per cent reduction in output rating at temperatures over 35° C (95° F) is shown in the graph in Figure 4.

Dry-disc rectifiers have the characteristic of unlimited life; provided that they are not operated at current ratings exceeding their capacities or allowed to overheat. With the correct combinations of stacks, it is possible to use rectifiers of this type in chargers supplying up to 12 amperes, d-c.

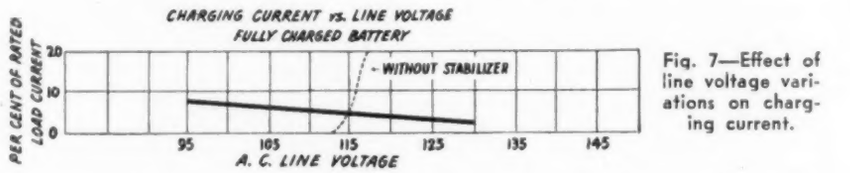

Fig. 7—Effect of line voltage variations on charging current.

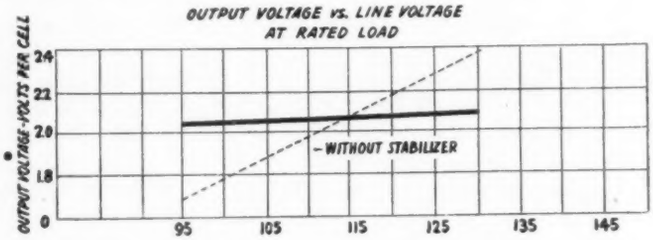

Fig. 8—Effect of line voltage variations on d-c voltage output.

Automatic Battery Chargers—Voltage Control Relay

LOW CAPACITY chargers used in continuous float service need automatic regulation as much as do the larger charging equipment used in heavy duty service.

In the automatic copper-oxide battery charger manufactured by General Electric, a voltage control relay is employed in conjunction with a resistance network which depends on the voltage of the battery for the operation of the relay. An automatic temperature compensating device is also utilized to allow for variations of the ambient (surrounding) temperature at which the battery oper-

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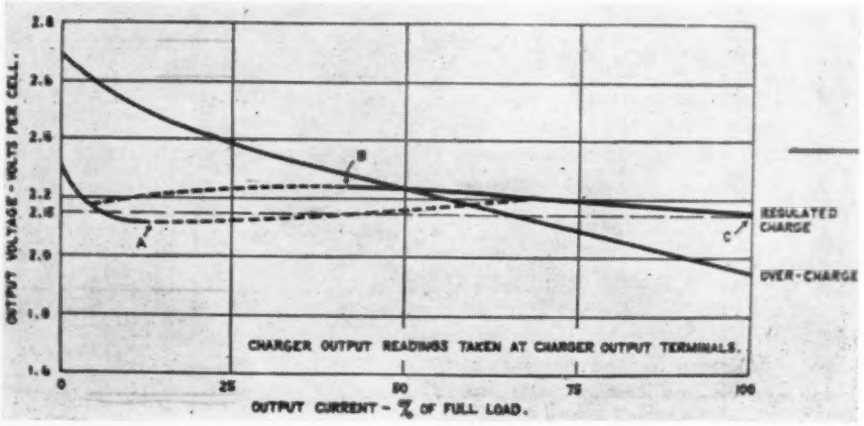
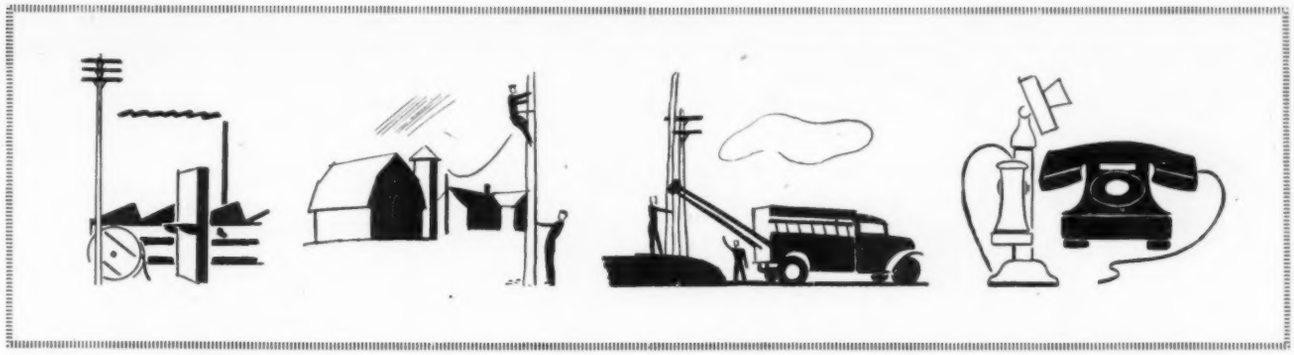


Fig. 11—Characteristic curves of cell voltage versus charger output of North self-regulating charger.



A determined industry moves ahead on all fronts — using every expedient to get the job done!

INGENUITY Of TELEPHONE INDUSTRY WHIPPING HELD ORDER SITUATION

By JOHN G. REYNOLDS
Managing Editor, Telephone Engineer Publications

Determined to abolish "held order" files the telephone industry, in the face of still present shortages, uses its ingenuity to whip a bad situation . . . Dummy boards go up . . . Submarine cable goes underground . . . Schoolboys "prewire" residences. And it all adds up to "Service For All Those Who Want It"!

NOT LONG ago our mutual friend of the air lanes, Kate Smith, wised up the nation with a few remarks about the tremendous job faced by the telephone industry in catching up with its long waiting list —"held orders" to you. Kate and her announcer Ted Collins stated that "*the men who keep this nation talking over the wires have a double-header problem. Not only have demands for telephones jumped by leaps and bounds but long distance calls have increased* 137 *per cent.*"

They also stated a fact that Independent and Bell men know only too well — "*that although there's a pretty good supply of telephone instruments now, the wires and dials and office equipment are just not available.*"

One of the toughest jobs faced by the telephone industry today is the task of telling would be subscribers that it is unable to provide the telephone service they want. Those in the field know that Kate spoke the truth — that today, in the second year after the war's end the industry has been unable to obtain sufficient equipment, materials and supplies to satisfy the abnormal demand for service that has developed as a result of (1) new and expanding industry, (2) increased population in practically all areas.

Telephone service is an accepted American institution and telephone men everywhere, despite the present, unprecedented increase in the usage of and demand for, are pushing forth every possible effort to catch up on service demands and retain a high standard of service.

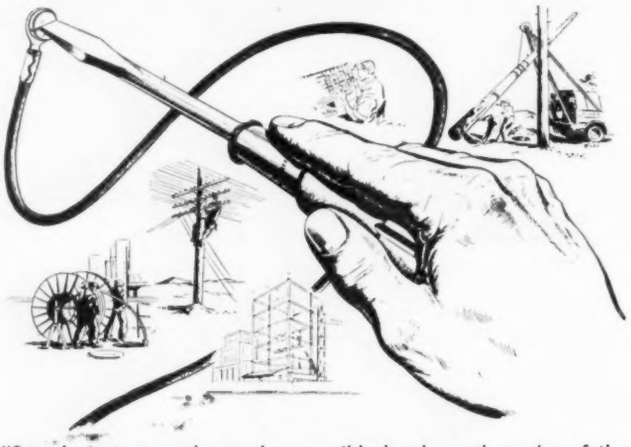
The readjustment days of the present are also days of service expansion. Slowly but surely the flow of raw materials in the form of telephone equipment, is gradually catching up with the extraordinary increase in the demand for telephone service. Everywhere, Independent and Bell men are displaying the industry's ingenuity to stretch facilities to capacity, setting records at installing new, additional equipment the moment it is available. The industry as a whole is displaying to an appreciative and understanding public the fact that it is doing everything in its power to provide telephone service to everyone who wants it. That the industry will accomplish the job is beyond doubt. A few examples of how they're doing it are discussed in this article.

Building Materials

ONE OF the biggest headaches for the necessarily expansion-minded telephone companies has been the existing shortage of building materials. Brick, tile, structural steel, lumber, heating equipment, electrical supplies, metal doors, window frames —in fact about everything that goes into a building have been on the "short supply" list.

The shortages of building supplies admittedly slowed down the progress of all telephone companies. But substitutions of material and temporary installation of substitute equipment has been the rule.

Last year one company awarded a



"Speed—just as much speed as possible has been the order of the day and it will be the motto until the public is served and the industry must send out its salesman to scour the woods for new subscribers."

contract for the construction of a standard, structural steel frame building. The steel strike came along—and while the excavation was being dug the building was redesigned for reinforced concrete frame. Ingenuity? Yes, but more a case of meeting circumstances face to face and moving ahead despite conditions.

Brick has been short for many construction jobs. So telephone men have scoured the brickyards, trucked bricks in if necessary. Made it a rule to get buildings ready at the earliest possible moment. If brick was slow in arriving, inside walls went up first and in some cases equipment installation started before the outside walls were up.

Often when heating equipment delivery was delayed, temporary heating units were placed. In one known case, when roofing material could not be procured, a temporary cement covering was put on to keep the rain from dripping on the switchboard installers.

Sub Station Equipment

UNUSUAL circumstances demand unusual actions, and to meet today's service demands, the telephone companies of the United States have had to, in many cases, deviate from tried and tested methods and practices.

During the war the companies added millions of telephones with only a small amount of additional plant. Telephones that under normal conditions would have to be junked were reconditioned and installed. Telephones were converted from one type to another to meet special needs. Loads on central office equipment were increased high above that for which it was designed with ordinary standards of service.

Companies have reconditioned old type telephones. Surplus coin telephones have been converted to wall sets; manual desk stands have suddenly become automatic. One example of sparkling ingenuity is found in the manager who devised a combined set for use where the bell boxes could not be fastened to the walls, by mounting a hang-up set and bell box back to back on a wooden base.

Another story of ingenuity is found of one company that seriously needed magneto rural sets. Blocked by shortages, the company went out in the rural areas and found magneto sets that had been discarded when farmers' service station lines were cut over to automatic operation several years before. A time-taking procedure but it proved to the community and the waiting list of potential subscribers that the company meant it when it said its job "*was to serve every single person that we possibly can and get service to them as fast as we can.*"

"The telephone industry is determined to continue its record of giving the public service when it wants it!"

Central Office Equipment

SPEED—just as much speed as possible—has been the order of the day from the manufacturers right to the installers and it will be the motto until the public is served and we once again must send our salesmen to scour the woods for new subscribers. Probably no better indication of the speed with which companies have tackled the present job is going the rounds than the story concerning an Ohio installation. In this case building workmen had just completed placing the first strip of linoleum on the new equipment room floor when the equipment installers started drilling holes and placing frame supports while the building workman continued the linoleum laying job!

That one little story is but one example of the speed that telephone companies are using to whip to a standstill the orders that are being held due to a lack of central-office equipment. It has been truly said that whipping the central-office equipment shortage is the most important factor of the catch-up-with demand and improve service program.

And here again we see plenty of ingenuity and gray matter being used. Companies have surveyed exchanges, and the equipment of any office with a small margin of equipment over immediate demand has been put to good use. In large cities subscribers in a boundary area have been transferred to less congested offices (providing the Community of Interest factor justified); customers from one office area have been connected into another office area by utilizing spare trunk conductors or placing new trunk cables.

Equipment has been removed from one office and installed in another to meet service demands. Telephones on party lines have been increased until each line handles its full quota. In many cases this has been accomplished by connecting the pairs serving the parties right in the central office itself!

Terminal numbers have been a problem. The job of making every number work all the time has been accomplished by assigning a new customer to any disconnected number as soon as it is released. Sure, it is not normal practice and the new subscriber gets a few calls intended for

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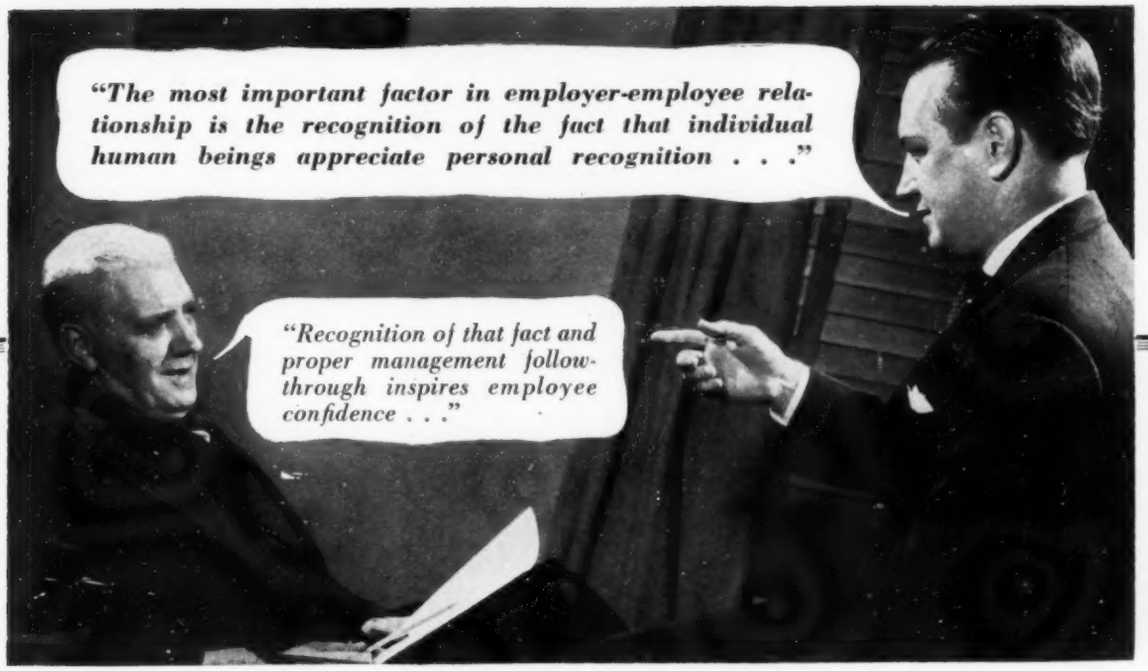

"The most important factor in employer-employee relationship is the recognition of the fact that individual human beings appreciate personal recognition . . ."
"Recognition of that fact and proper management follow-through inspires employee confidence . . ."

Personal Recognition of Employees Aids Employer-Employee Relations

By
ELIZABETH DULL
Secretary-Treasurer
Harrisonburg (Va.) Telephone Co.

Officials of the Harrisonburg (Va.) Telephone Company take active interest in personal welfare and advancement of each employee. Miss Dull's review of Harrisonburg Company's progress in employer-employee relationship, proves programs have won loyalty and esteem of emloyees.

PEOPLE! The whole world is full of them—all kinds, shapes, colors, creeds—*but each is an entity—an individual.*

It seems to me the most important factor in employer-employee relationship is the recognition of the fact that individual human beings appreciate personal recognition.

Employees have come to expect certain things from their employers, such as reasonable working hours, an adequate wage—one which will allow them to maintain a decent standard of living—and safe, pleasant working conditions. They are justified in expecting all these things, and in most companies they get them. But you will find that the employer who really has the loyalty, admiration, and respect of all of his employees is the one who is willing to go further—who voluntarily goes "*the second mile*".

I would like to tell you a few of the "*second mile*" things the management of our company is trying to do.

The Harrisonburg (Va.) Telephone Company now has 105 employees. Our first effort, shortly after a new employee comes to us, is to meet and talk with him—explain the workings of the company—see that he meets his co-workers and as many other persons in the organization as possible. We publish his picture in "*The Relay*", so that all employees know a little something about him. We take every opportunity to talk with him so that no matter when or where we see him we feel free to stop

and pass the time of day—and we try to make him feel he is an important member of our telephone family.

Employees Part In Company's Success

THROUGH pages of *"The Relay"*, our company house organ, we try to make all employees feel that they play an important role in the success of our company. We run special articles or news items about outstanding personalities whenever it is possible. We welcome suggestions and contributions in every form—pictures, news items, articles. We try to get employees to contribute by appointing reporters from the different exchanges or departments, and giving them a by-line. In other words, we attempt to make every employee feel that *"The Relay"* is his magazine, and make it such that he can be justly proud to claim it.

While it is rather hard to get a great many to contribute, we do feel some headway has been made when we are stopped on the street, or in the course of a conversation, and told something the employee has heard or seen which he thinks would be interesting to our readers—and when he voluntarily offers to get pictures or a story for us.

He knows we welcome his criticism and comments, and that if he reads something with which he does not agree, we are glad to have him tell us. If we are wrong we try to remedy our error, or if we feel we are right we try to get him to understand our point of view.

We try to encourage and keep track of all interdepartmental parties and special events, such as engagements, weddings, special anniversaries, etc., and give them as much in *"The Relay"* as possible. And above all—we try to make *"The Relay"* personal, by keeping it informal.

The President of our company sends out greetings to each employee on his birthday and anniversary. The forms of these greetings change each year. We have at least one company party each year to which all employees are invited to bring a guest. No trouble or expense is spared to make these parties outstanding events—attractive and unique. Informality and friendliness is the keynote—so that each will feel he can come and be himself and have a good time. We try to vary the parties enough so that employees will look forward to something a little different each year.

For those employees who have service records of 25 years or more,

Miss ELIZABETH DULL has been connected with the Harrisonburg (Va.) Telephone Company since January 13, 1930. Beginning as a clerk in the Commercial Department, she has a record of steady advancement, serving as assistant to the president, assistant secretary-treasurer, and secretary-treasurer, in which capacity she now serves. She is also personnel director, and is editor of "The Relay", the Company's monthly employee magazine. Since 1944 she has also been assistant secretary-treasurer of the Virginia Independent Telephone Association.

we have special celebrations, usually a dinner party, at which he is the honored guest, and at which time he is presented a service pin either by the President or the General Manager of the company.

Departmental conferences are held at regular intervals, at which practices are gone over and explained. At these conferences each employee is given an opportunity to bring up any problem in his work which has been bothering him. His suggestions for better ways of doing a job are heard and given every consideration.

When Illness Strikes

WE try to give all employees a feeling of security in case of illness by carrying a sickness and accident policy on each individual—the premiums paid by the company—and by carrying employee-participating hospitalization and life insurance policies.

When a Harrisonburg Telephone Company employee is sick, he knows his employer is standing by, either through personal visits, cards, or flowers.

While we do not at the moment have a definite pension plan, this is now under consideration and in the near future every employee will have a feeling of security for that time when his active duty is over.

Enough confidence in management has been inspired so that if an employee has a problem or complaint he knows he can go direct to headquarters, and that he will receive every courtesy and consideration, and that whether his problem is personal or otherwise, he will be given all possible help.

Employees who have done exceptionally good jobs are given an opportunity to go to State and National Conventions whenever it is practical—or he is taken by one or the other of his employers on some trip.

And when that bug-bear time of year approaches—March 15th—the employees of our company know they do not have to struggle with their income tax returns alone, but that there is someone in the organization who is willing and eager to help him with it, and who will take

(Please turn to page 69)

Another Birthday? *Congratulations!*

As you stand on the threshold of another year,
May it bring you vision to see beyond fear—
Bring you faith to believe in a future bright—
Bring you courage to do the things that are right—
Bring you happiness, joy, and a heart so gay
You'll be glad for the dawning of each new day!

President

President of Harrisonburg Telephone Company personally sends out greetings when an employee's birthday rolls around.

Roland C. Davies
Editor
Telecommunications Reports

Our WASHINGTON BUREAU Reports

By
ROLAND C. DAVIES
and FRED HENCK

Interstate Toll Revenues

THE PLANS of the nation's state public utility commissions for a detailed study of Bell System practices on the division of interstate toll revenues between the A.T. & T and the Associated Companies, launched into full swing by the disclosure of the FCC's consideration of another long lines rate slash, were further implemented in conferences of the staff subcommittee of the National Association of Railroad and Utilities Commissioners and FCC with officials of the Bell System.

The scope and direction of the study were blueprinted in general terms at the sessions, which lasted four days. Heading the NARUC group were E. F. McNaughton, Director of Public Utilities of the California Commission and Chairman of the NARUC telephone staff subcommittee, and L. T. Hayner, communications consulting engineer and former FCC chief rate engineer, who was engaged by the NARUC for the work.

A concentrated and accelerated 60-day study was agreed upon by NARUC Special Telephone Committee in Washington a week before the conferences with the Bell System officials. The program was unanimously approved by the Association's executive committee. It was understood that in view of the study and pending its completion, there would be no immediate further proceeding by the FCC on its study of reduction of A. T. & T. Long Lines Department interstate rates.

In the event that the FCC does decide to reopen its study of the long lines rate slash—and there is a good possibility that the separation results may tend to prevent such a cut—the FCC Telephone Committee, headed by Commissioner Paul A. Walker, will advise the NARUC group in advance.

Every state commission was understood to have endorsed the separation study. It was agreed also that there will be no consideration in the separation study of the A. T. & T. license contracts and fees. This had been urged, it was reported, by Tennessee Commioner Leon Jourolmon, Jr., former NARUC Telephone Committee Chairman.

Indicative of the jurisdictional situation coming to a head, and the variance of views between the state regulatory agencies and the FCC, was the action of the NARUC Executive Committee to intervene in the FCC suspension of interstate interzone extended service rate increases in the Washington metropolitan area. The Maryland and Virginia commissions have granted rate boosts to the Chesapeake & Potomac Telephone Cos. operating in those two states, but the FCC promptly moved in and suspended the controversial interzone interstate rates. A hearing will be held on the matter March 25, with the two state commissions sitting with the FCC Telephone Committee.

Meanwhile, the C. & P. Cos. vigorously fell in line with the state agencies in letters to the FCC that the Commission suspension order was outside the agency's jurisdiction. The letters stressed that the companies' position was taken in accordance with the 1943 Federal statutory court determination of the telephone rate jurisdiction case in connection with Kansas City, Mo., and Kansas City, Kans., which resulted in a victory for the Southwestern Bell over the FCC.

The two Bell companies said they would continue to apply the rates fixed under the new schedules, but charges are not being made to subscribers as a result of the FCC's suspension. They will be recorded to provide information on the matter, but the companies will file no suspension supplement of the interstate interzone rate as specified by the Commission in view of the state regulatory bodies' approval of the new schedule.

The FCC then brought the matter to more of a head by promptly issuing a show cause order, to be made part of the March 25 order, asking the C. & P. to show why the FCC should not request a writ of mandamus; ask the Attorney General to apply for an injunction to enforce the Feb. 14 suspension order; and proceed with enforcement of the provisions of the Communications Act for punishment of violations. The FCC cited Section 203 of the Act, which provides fines of $500 and $25 a day for violation of the Act, apparently to show that it was not kidding.

◆

Labor

THE PROJECTED launching of the new national union of telephone workers, the Communications Workers of America, by April 1, may have a profound effect on the bargaining activities of the telephone workers with the Bell System and, as a corollary, with the Independent telephone companies in which present affiliates of the National Federation of

ILLINOIS Commercial Company Denied Rate Boost

THE Illinois Commerce Commission on February 24 denied the rate-increase application of the Illinois Commercial Telephone Co., which serves 575 Illinois communities.

Chairman John D. Biggs, in announcing the commission's order, said, "The proposed rates are cancelled and annulled."

"From the record as it now stands," Biggs added, "the commission must regard the present rates as reasonable."

Telephone Workers are collective bargaining representatives.

The temporary officials of the CWA, President Joseph A. Beirne, Vice President John J. Moran, and Secretary-Treasurer C. W. Werkau, who hold similar posts with the NFTW, have announced "serious consideration" of instituting the new national union by April 1, instead of about July, as had been previously expected. Thus telephone companies in bargaining negotiations with their unions, if the unions are CWA-affiliated, would be dealing with a division of a national union rather than a member of a loose federation, as exists at present.

Inception of the CWA was seen as definitely strengthening the hand of the union in bargaining, and the April 1 date was important in view of the fact that April 7 is the strike deadline the NFTW has set in its bargaining with the Bell System.

Mr. Beirne also announced that the first business meeting of the new CWA will be staged June 8 at Miami Beach, Fla. Under present plans, the interval between April 1 and June 8 would be used to wind up the affairs of the NFTW, which would also hold its final meeting June 8. The latest count on the CWA is 187,391 telephone workers, and their unions act as bargaining representatives for about 275,000 employees. This is well over the constitutional requirement for the formation of the CWA, and the total is expected to swell considerably when reports from referendums conducted by the NFTW affiliates are all in.

The NFTW President made a highly important statement in an appearance before the Senate Labor and Public Welfare Committee a few weeks ago when he disclosed a personal inclination toward arbitration, rather than a strike, if he were faced with a choice between the two. At another point, the NFTW chieftain said his union would not strike on one or two of its 10 national bargaining items, if satisfactory settlements were made on the others.

A significant line of questioning by Senator Ellender (D. La.) on how the telephone companies could pay higher wages with their rates under regulation, and many companies filing for higher rates, brought from Mr. Beirne the observation that there "has not been a single instance in the field" in negotiations on new wage contracts "where management has pleaded inability to pay." He argued that the Bell companies had not received rate boosts for 14 to 20 years before the present surge of rate boost applications, but that wages paid his union members had been progressively higher through that period.

On industry-wide bargaining, Senators Ball (R. Minn.) and Ellender strongly indicated their disapproval of any measure which would allow one-union control over an entire industry. Senator Ball conceded that while the Bell System might be considered a single industry, the Independent companies certainly are separate companies and should be bargained with locally. Mr. Beirne agreed on this point.

Thus far, with less than a month to go to the strike deadline, the negotiations with the Bell System apparently are not going so well. The NFTW President issued a press release early in March which took the A. T. & T. for alleged stalling and union-busting tactics, and charged that the Bell System management is attempting to return wage and working conditions in the industry to where they were 10 years ago. The blast was considered, however, to be part of the NFTW bargaining pressure, rather than any indication that negotiations had broken down.

◆

No Probe Of FCC Likely

THE rumored investigation of the FCC by the House Executive Expenditures Committee has become a dim possibility, and there is little likelihood of such action at this session of Congress, Rep. Clare Hoffman (R. Mich.), Chairman of the Expenditures group, told TELEPHONE ENGINEER AND MANAGEMENT recently.

Rep. Hoffman, unhappy over the refusal of a requested $75,000 appropriation for the committee to carry out other investigations, declared he would no longer pay investigatory expenses from his personal expense allowance, which he contended he has been doing since Congress opened. He added that "You can't run a car without gas," indicating strongly that any probes by his group, including that of the FCC, would not be considered unless the group was allocated some funds for operations.

◆

Excise Revisions

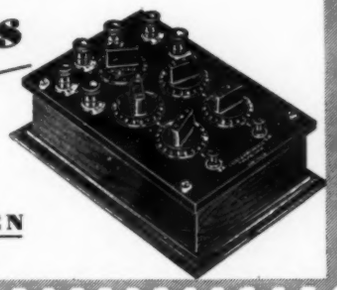
ALTHOUGH House Ways and Means Committee Chairman Knutson has announced that his group is studying plans for a revamping of the entire excise structure, any concrete action appears bogged down in the morass of the Federal budget ceiling, national debt reduction, and income tax revision, and no definite moves can be expected until the entire tax-fiscal situation is pretty well straightened out.

Meanwhile, the Grant Bill to extend indefinitely the special wartime excise rates has had its legislative path cleared somewhat.

USITA Executives CONFERENCE Set For Edgewater Beach Hotel, Chicago, Apr. 14-15

Plans for 1947 Executives Conference of the United States Independent Telephone Association at the Edgewater Beach Hotel in Chicago on April 14-15 are progressing. Subjects and speakers selected for this important gathering of the policy-makers of the Independent companies will soon be announced. The Program Committee and officers are doing everything they can to assure that this year's conference will reach a new high in interest and value.

MODERN Testing Instruments



–By–
B. C. BURDEN

PART II

"Hunt and find" testing procedures, and testing equipment of 1910 vintage are out. In this second of a three part series dealing with "MODERN TESTING INSTRUMENTS", Mr. Burden continues a training or refresher course for telephone men who desire to improve present testing procedures.

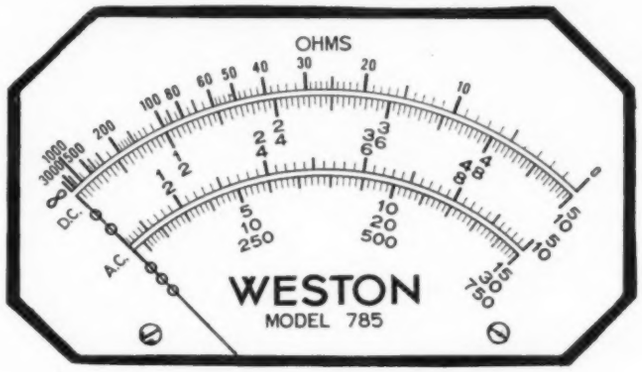


Fig. 6—Scale of Weston Model 785 Instrument.

SPECIAL components for use with the Model 785 permit current measurements at much higher values.

This instrument is particularly useful for engineering investigations involving abnormal conditions as almost any voltage, current or resistance condition can be determined with the one instrument at excellent accurance.

This instrument is particularly useful in the central office for checking ringing machines, transmission, battery charging currents, and for many other purposes. A facsimile of the scale is shown in Fig. 6. Although the illustration does not so indicate, the actual scale is in two colors (red and black) to permit distinguishing between the d-c and a-c ranges. The set employs a basic 50 microampere movement.

The Inductive Tone Cable Fault Set

CABLE faults can be located by inspection, by means of the Wheatstone Bridge, or by use of an inductive tone fault locator. Oftentimes all three methods are required. Many cable faults can be quickly located by a simple visual inspection of the cable in which the fault is known to lie. This is true of such faults as mechanical damage to the sheath due to tree movement, sheath damaged due to cables rubbing against poles or buildings, etc. However, in general, it is an inefficient time-consuming method that often fails to produce results and is not recommended as a general practice.

The ideal method of locating cable faults is to check all faults with the Wheatstone bridge before leaving the office. This check determines the approximate location of the fault. The actual location can then be determined by means of the inductive tone set. A tracing tone is sent out on the cable pair or pairs in trouble (usually from the C.B.) and flows toward the fault returning thru the fault to the tone source. The a-c electro-magnetic field set up around the conductors (see Fig. 7) which carry the

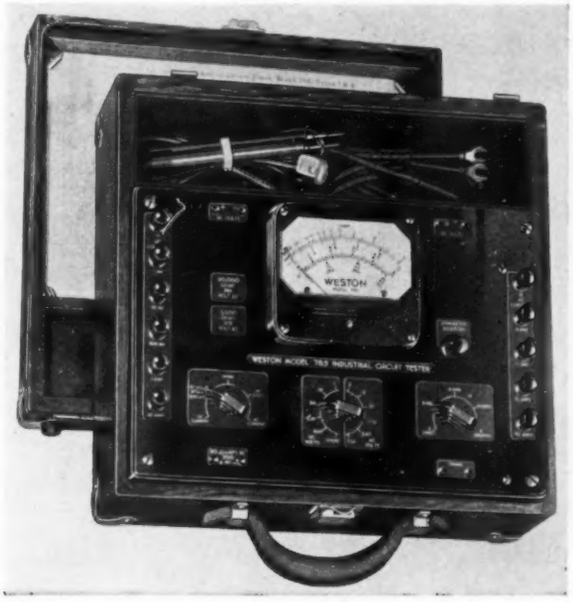


Fig. 5—The Weston Industrial Circuit Tester (Model 785).

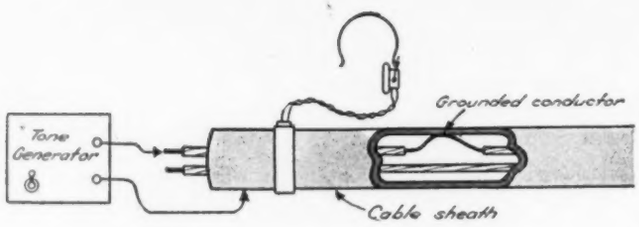


Fig. 7—Action of Inductive Tone Cable Fault Set.

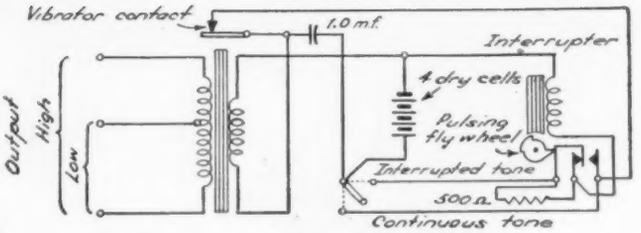


Fig. 8—Circuit of Typical Inductive Fault Finder.

fault current will induce a voltage in an exploring coil held against the sheath which gives an audible tone in a head receiver.

Theoretically the fault tone should not be heard beyond the fault. However, on long cables and particularly with high resistance faults a part of the tone current will carry beyond the fault due to the cable pair capacitance which acts as a shunt to alternating current. This is known as "carry-by current".

"Carry-by current" may also be due to current flowing on the sheath and messenger to ground both ways from the fault.

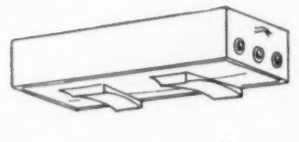
The efficiency of the inductive tone method depends on many factors such as the length of cable involved, the resistance of the fault, the location of the cable pair in trouble within the core, etc. Cable pairs which are located in the outside layers next to the sheath give a better "pick-up" response in the exploring coil than do those located in the center of the core.

Tone Set Schematic

THE basic circuit of one type tone generator is shown in Fig. 8. It operates off of four dry cells, consists of a vibrator unit which generates audio frequency tones with the major part of the energy being in the 800-1400 cycle range. Low and high impedance output terminals permit the output voltage to be selected to fit the type of fault. Low resistance faults require connection to the low impedance terminals and high impedance faults to the high impedance terminals.

Some tone units are equipped with interrupter springs in addition to the vibrator springs. These springs interrupt the normal tone current at a periodic rate (about 25 to 40 times per minute). This makes the tone more readily observable when picked up in the receiving coil.

The exploring coil consists of a laminatec core with a large number of turns of wire and usually with a choice of two connections as shown in Fig. 9.



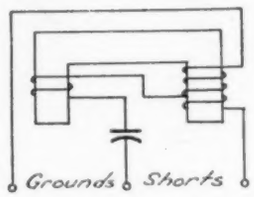


Fig. 9 — Schematic of W. E. Exploring Coil.

Use of Tone Set

A TONE set can be used for the location of such faults as shorts, grounds, and crosses, and also split pairs, split quads, etc. Split pairs can be located by virtue of the fact that as the exploring coil is moved along, the cable sheath tone will alternately rise and fall ("Picket fence effect") due to the neutralizing effect at points where the two wires of the twisted pair occupy the same relative point with respect to the coil. This effect is shown in Fig. 10. It will be seen that a continuous tone will be heard on one side of the fault and the picket fence effect on the other, hence the exact location of split pairs can be determined.

Location of Wet Spots

THE location of wet spots in cable with the tone set is best accomplished by grouping the wet pairs as shown in Fig. 11. The practice of connecting one or more pairs to one terminal of the tone and connecting the opposite terminal to ground is not recommended as the "carryover" effect tends to give a false indication.

Use of Amplifier

THE range of an inductive fault finder can be extended by use of a two stage vacuum tube amplifier having a gain of between 40 and 75 decibels. An amplifier is particularly useful when the fault resistance is high which makes the tone picked up by the exploring coil inaudible.

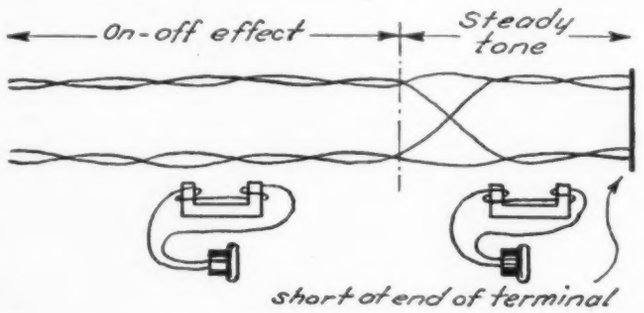


Fig. 10—Location of Split Pairs with Inductive Tone Set.

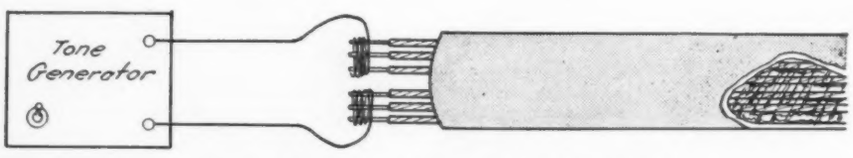
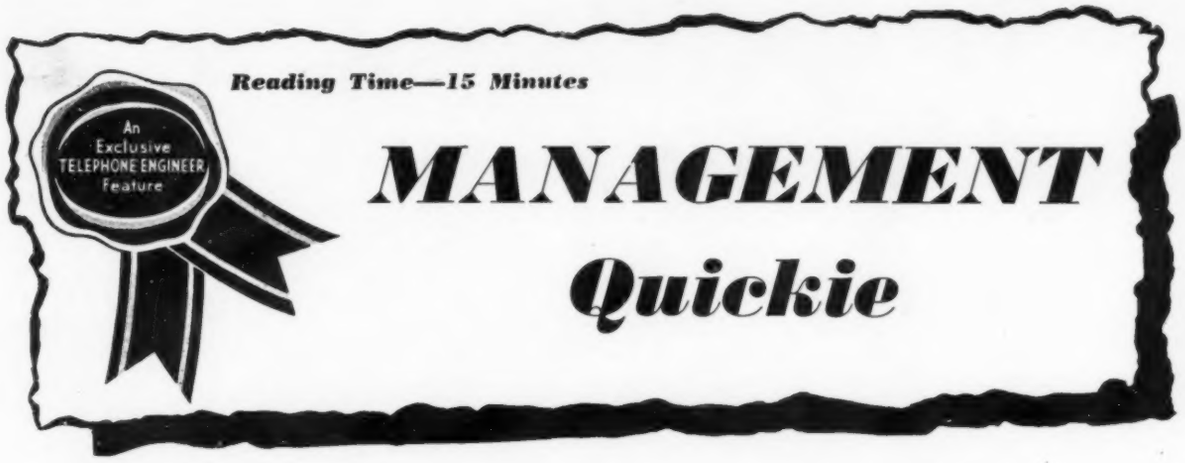


Fig. 11—Best Arrangement for Locating Wet Cable Faults.

TO BE CONTINUED

Continue with Part III of Mr. Burden's article on "Modern Testing Instruments" in the April 15 issue of TELEPHONE ENGINEER AND MANAGEMENT.



Reading Time—15 Minutes

MANAGEMENT Quickie

Service Upgrading--First Section

THE TELEPHONE industry sells an intangible. In this it is different from other kinds of business. Its product is the ability to communicate by the spoken word at will with distant points. It has assured market which may, within limits, be expanded by proper management policies. In furnishing telephone service the management problem is betterment. That is betterment of revenue, betterment of service and betterment of plant. Each is important and none will permit of neglect. Alert management of the telephone plant does not accept conditions as they are if betterment is possible. Emphasis may be shifted from one managerial activity to another by circumstance. Under normal conditions the betterment of revenue is the prime assignment. Revenue betterment involves formal rate increases from time to time. It also involves continuous routine effort, for instance, to increase the receipts from toll business, to upgrade existing service and to sell service to additional subscribers.

In the study of service upgrading the effective rate schedule must be scanned. This will disclose the grades of service which offer possibility of revenue betterment through upgrading. Usually the service supplied at the lowest rates is the most promising field. For illustration, the switching service subscribers, listed by lines, are usually service upgrading prospects. In beginning a drive to upgrade switching service management will select lines which are not in good condition over which service is not good.

The object in upgrading any service is to increase revenue. Another object is to raise the standard of exchange service as a whole by eliminating the bad spots. If revenue from switching service subscribers is satisfactory considering the costs of rendering the service, which is usually not the case, there is no reason, except general service betterment, for upgrading. The change from switching service to company owned plant service should not be considered unless the **rates** for rural service over company owned plant have previously been adjusted to a satisfactory figure. New company owned lines must be built if not already available. The **service** over company owned plant at adequate rural rates must be good. The rural community now demands the best in all respects including telephone service.

It is most important that telephone companies serving the rural community **now** acquire ownership of all rural telephone plant. Without this the demand for better service may result in the invasion of some form of government owned or subsidized telephone system. The telephone contact with the rural communities must and will be maintained. Possibly present material and labor costs **are** higher than they will be in a few years. With switching service plant in less than good condition, with switching telephone service less than good, with rising costs in almost everything else an established fact, the demand for better rural telephone service is the basis for a successful upgrading campaign.

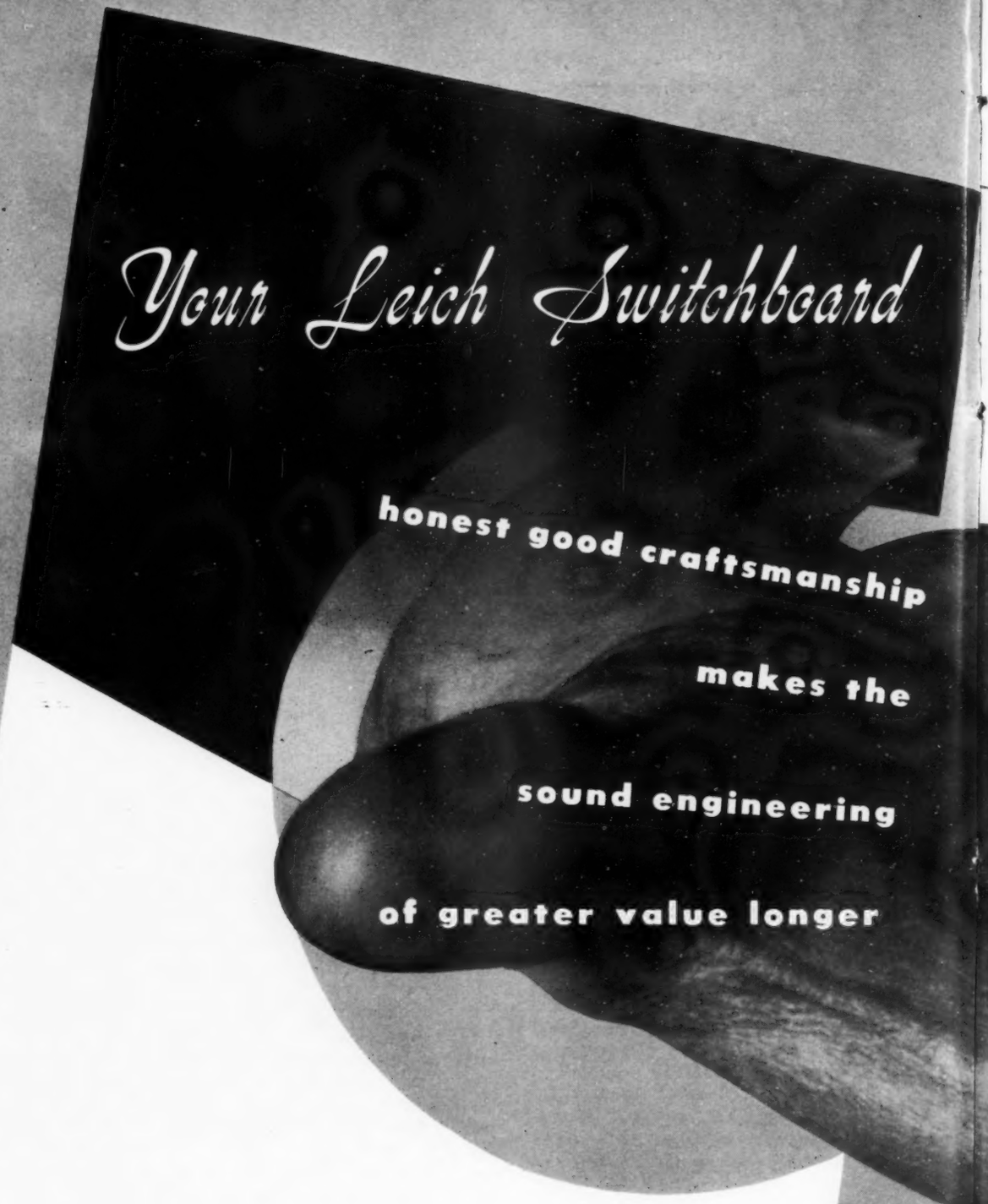
Select the line which is rendering the poorest service for a start. Contact the connected parties (in one case the line selected for initial attention had 27 telephones and was a grounded circuit). Show them that the increase in cost for good service per day will be small. In most cases the difference is three or four cents per day only. Publish newspaper advertisements appealing to the women on the farms on the general basis of modernization. Continue the newspaper advertising setting out the advantages to be considered. Advantages are relief of subscribers from any responsibility for plant maintenance, clearer transmission, less interference due to fewer connected parties, new and modern instruments and **individual accounts with the telephone company.**

The value of this lies in simpler handling of toll charges and freedom from concerted line action on service bills. It is important to use the newspapers this way. It is cooperative and they so consider it. With the newspaper advertising individual advertising slips can be sent to the individual subscribers of the switching service line selected. Copy for the newspaper advertisements is available ready for use at small cost. The use of the ready made copy for the newspapers and the ready made envelope stuffers is strongly recommended instead of using home made copy.

When switching service subscribers begin to display interest the matter is progressing. Each applicant for service over company owned plant should execute the standard service contract and **construction of the new line should be started at once.** In the case of switching service lines having more than ten stations it will be necessary, of course, to build more than one new circuit. More than ten stations should not be connected to any new rural line.

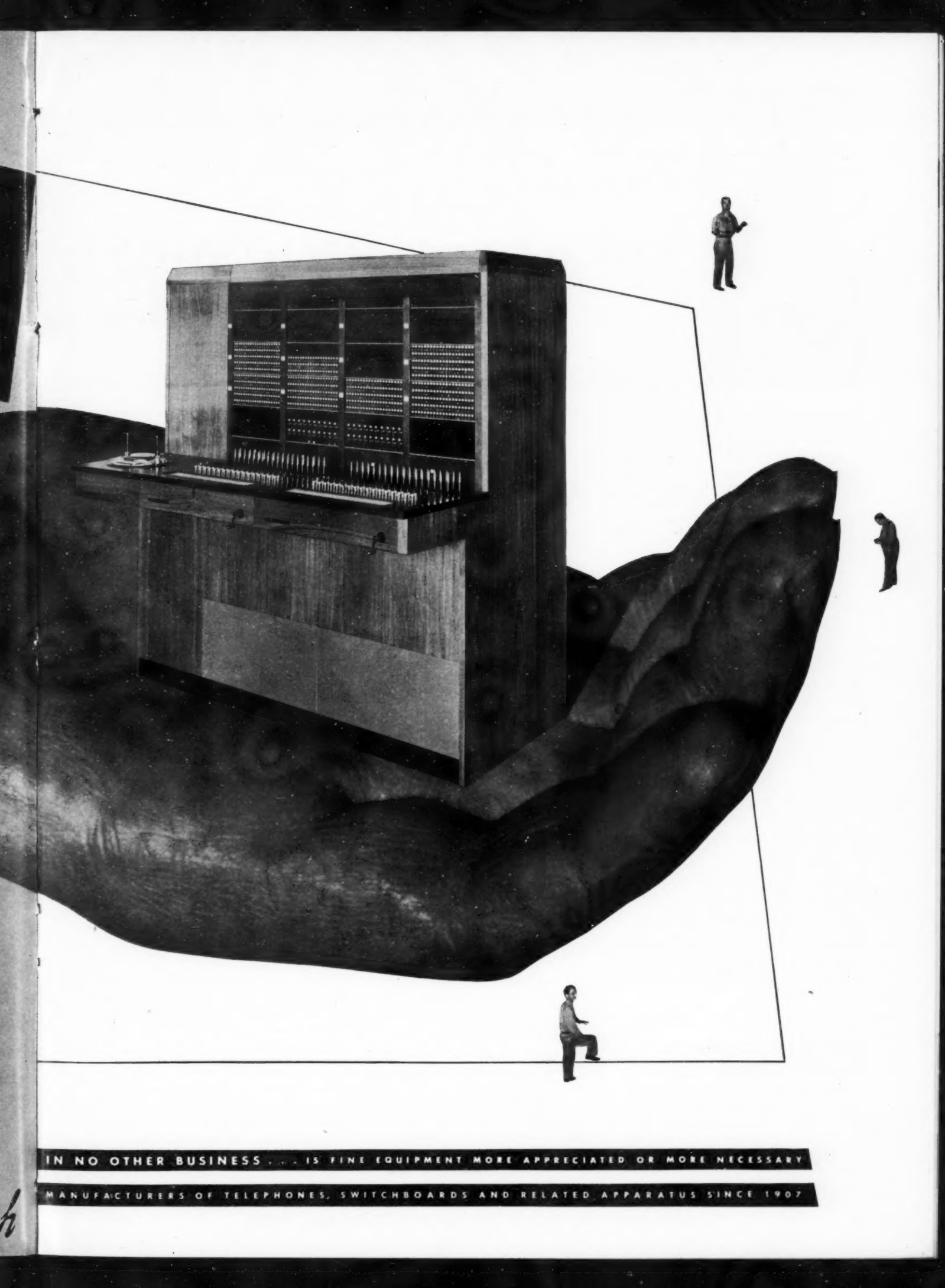
It is to be remembered that the upgrading of switching service telephone lines into company owned rural lines

(Please turn to page 63)



It may look pretty. No doubt it's equipped with all the engineering and operating features you've dreamed your new board would have. These things are very important. How *it's made is just as important. And how it's made depends on who makes it. There's Sally who wound the relays, Joe who fitted the face equipment into the cabinet, John who laid out the cable, Steve who tested the board* twice, *and even Carl and his gang who made sure that all was packaged properly for safe shipment. These people are proud that they work for Leich. They are rightly enthusiastic about their skill and expertness. They are eager and willing to go to the extra trouble necessary to do their job right. For they* know *that they are making the best "gosh darn" switchboards that were ever made. And . . . a lot of telephone men using Leich switchboards will tell you . . . . these Leich folks are right. Leich Sales Corporation, 427 W. Randolph St., Chicago 6, Illinois.*

Leich



IN NO OTHER BUSINESS . . . IS FINE EQUIPMENT MORE APPRECIATED OR MORE NECESSARY

MANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 1907

Current COURT and COMMISSION Activities

Lincoln (Neb.) T. & T. Requests Increased Rates

The Lincoln (Neb.) Telephone & Telegraph Company has filed with the Nebraska State Railway Commission an application for approval of a new schedule applicable to all of its exchanges throughout the 22 counties in southeastern Nebraska where telephone service is provided by the Lincoln company.

The management of the company stated that increased income is required in order to offset the substantial increases in operating costs which the company has experienced during, and since, the war years. The company is meeting increased costs in every line. Construction costs, material and supplies for maintenance, wages of all kinds, and taxes have eaten deeply into the revenues of the company. In spite of greatly increased volume of business, operating costs have increased at a higher rate than income.

During the war, due to shortage of material and manpower, it was impossible for the company to adequately maintain or expand its facilities. The program now calls for the expenditure of some $5,000,000 in the next two or three years in conversion of exchanges, the addition of plant facilities of all kinds, and the construction of new exchange buildings.

The proposed rates are in line or generally lower than telephone rates in many parts of the country.

◆

Rochester, Ind., Company Requests Rate Increase

A petition asking for a review and increase in rates has been filed with the Indiana Public Service Commission by the Rochester Telephone Company. The basis for the request of new monthly rental charges was outlined as due to continual growing costs in all materials and equipment, higher taxes and a substantial raise in the payroll schedule.

The petition states that present rates were established in 1925 and that there has been no change made in the last 22 years. Details are outlined of gradual raises in costs over the years. It is also stated that provided the rate increase is granted there will be an increase in the company payroll at once.

The company recommends new rates for each classification of users. If granted this will provide an additional income which would amount to an increase of 17 percent over the company's total operating revenues for 1946.

◆

Michigan Commission Upholds Rate Slash

A 1945 order reducing Michigan Bell Telephone rates by $3,500,000 per year has been reaffirmed by the Michigan Public Service Commission, but an early appeal to the supreme court by the company is expected.

William J. McBrearty, chairman of the commission, said the decision was reached after six months of study. The controversial rate case was sent back to the commission by Ingham County Circuit Judge Paul J. Eger last year.

"The commission still feels the company's return on its investment is unreasonably high," McBrearty said.

He said the company was receiving $11,374,000 annually on its investment of $167,179,000, or a rate of 6.8 per cent.

The reduction, which if upheld by the courts, would be effective as of January 1, 1945, and would reduce return to 5.51 per cent.

"This compares with a return of 5.12 per cent received by another utility, the Detroit Edison Co.," McBrearty said.

James Thompson Authorized To Purchase Interest In Company

The Arkansas Public Service Commission has authorized James Thompson of Tulsa, Oklahoma, to purchase a two-thirds interest in the Yell County Telephone Company for $17,000. The company operates exchanges at Plainview, Ola, Danville, Belleville and Havana.

Mr. Thompson was authorized to sell a one-half interest in the Standard Telephone Company to J. M. Nelson of Cotter, for $11,000. This system serves Cotter, Yellville, Marshall and Leslie. Mr. Nelson was authorized to borrow $12,500 to finance extension and improvements to the system.

◆

Mountain States T & T Requests Rate Boost

The Mountain States Telephone & Telegraph Company has announced it is filing new rate schedules with the Colorado Public Utilities Commission and municipal regulatory bodies in some home rule cities. Revisions are proposed in certain exchange and toll rates. The increases sought are based solely on present operating costs which have risen faster than revenues and have brought earnings in Colorado to a dangerously low level.

Although the Company is handling a large volume of business which increased its revenues 98 per cent over 1940, expenses are up 126 per cent, Alex Remneas, Colorado manager for the company stated in the application.

Earnings on the Company's investment in Colorado are at the lowest point in the last 25 years. They declined during the war years and have continued

to decline since, as operating costs continue to rise. Net earnings on the company's total investment in Colorado are now at a going rate of two per cent per year.

Since 1940 the Company has added nearly $12,000,000 in plant investment in Colorado. Remneas pointed out that during that time earnings have so declined that the company's net earnings in dollars are now only about two thirds as much as in 1940, which was a reasonably normal business year and the last full year before the war.

Greatly increased labor costs and higher material and equipment costs are some of the principal expense items affecting earnings. Wages paid in 1946 were approximately $12,130,000 which was more than three times the 1940 figure. Part of the increase was due to higher wage rates and part of it was due to additional employees required to handle the increased business. At the end of the year there were 5464 Colorado telephone employees on the pay roll compared to 2565 in 1940. These figures do not include employees on the company's general office staff in Denver but only those wholly engaged in Colorado operations. From each dollar of telephone revenue now received in Colorado 62 cents is absorbed by labor costs compared to 39 cents in 1940.

In building up the proposed exchange rates, the method used by regulatory authorities in most states and found by experience to be the best, was used. This method provided for a classification of exchanges into groups and, in general, setting rates according to the number of telephones in the exchange—the group embracing the smaller exchanges taking the lower rates.

The present schedules of exchange rates in Colorado have been in effect in many communities since 1919 and in practically all others for 20 years, during which time the number of telephones in the state has increased about two and one-half times.

◆

Rate Hike Approved for Mountain Lake, Minn.

The North Star Telephone Company, Mountain Lake, Minnesota, recently received authority from the Minnesota Railroad & Warehouse Commission to increase rates upon completion of conversion to automatic operation.

The North Star company serves approximately 413 local and 290 rural stations from its exchange in Mountain Lake. More than 97% of the subscribers signed contracts agreeing to the proposed rates for improved automatic service, and the Commission found that rates now in force will not produce a fair return upon the fair value of the property after the conversion.

The present and approved rates to become effective upon the first billing date following conversion to automatic operation are as follows:

Class of Service	Present Gross Rates	Approved Gross Rates
Individual Line Business	$3.50 (a)	$4.00 (a)
Two-party Line Business	3.00 (a)	3.50 (a)
Individual Line Residence	2.00 (a)	2.25 (a)
Four-party Line Residence	1.75 (a)	2.00 (a)
Multi-party Rural	2.00 (a)	2.25 (a)
Common Battery Bus. Extra (Optional)	.25 Net	....
Common Battery Res. Extra (Optional)	.25 Net	....

◆

Rate Increase Authorized For North Dakota Company

The North Dakota Public Service Commission has approved with changes, the application of the Traill County Telephone Company to increase rates for service in Hillsboro, Cummings, Kelso, Blanchard, Galesburg and Clifford. The company applied for a general increase in its telephone rates, including an increase of $1.00 per month for business service in Hillsboro, and an increase of 50c per month for business service elsewhere in its system. The company proposed an increase of 50c per month for residence service in Hillsboro and for multiparty line subscribers throughout its system.

It was estimated that the proposed increase in exchange telephone rates would yield the company about $4,161.00 of additional revenue annually. The company's gross operating revenue for the year 1946, excluding federal and state sales tax on telephone services, was approximately $19,300.00. The proposed rates would result in an increase of between 30% and 35% in exchange revenue.

The company has, for the past several years, charged about $2,865.00 annually to operating expense to cover depreciation in its plant and equipment. However the record shows that, as of December 31, 1945, the company has accumulated a reserve for depreciation of $56,418.00 against a plant and equipment cost of $73,160.00. The commission stated that the reserve for depreciation is now about 77% of the book cost of plant.

A NEWSPAPER Reports On The Cost of Telephoning

THE editorial department of the San Francisco (Cal.) *Chronicle*, recently took a long look at the "cost of telephoning." In an editorial the paper stated:

"The Pacific Telephone & Telegraph Company's case for a rate increase, presented to the Public Utilities Commission tells the same story of increased costs of operation that the company's millions of customers are familiar with in their own homes and businesses.

"In the face of expanding pay rolls and equipment charges and of descending earnings on its investment, the company asks permission to increase the price of its product—telephone service.

"As examples of these expanding costs, the company points out that in the past six years its pay rolls have increased 202%, cost of telephone poles 70%, cost of building construction 70%.

"Therefore it has no recourse but to ask higher rates. After considering the merits, the Commission should grant the request. . . .

"Though the new rates requested will add about 10% to the total phone bill paid by 3,000,000 California subscribers, they will not fall equally on every phone bill. The increased costs are to be spread over long-distance calls, installation charges and monthly minimum charges.

"Here is a situation where the rising costs which have hit consumers in respect to other necessities in the past year catch up at length with consumers of telephone service. The telephone company, like every other institution, public, semipublic or private, has to take care of the expanding Western community. *With the swollen post-war demand for its services, it has no choice of going backward or standing still. It must go forward, and in this case to go forward simply takes more money.*"

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your magneto-line subscribers with the very finest of
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The Magneto-Battery Box contains a battery-feed co
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for two No. 6 dry cells; or a two-cell "unit" battery may
The housing is of gleaming black plastic—a worthy com
of the beautiful Monophones.

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Cat. No.	Description
AO-74	Magneto Battery Box (less batteries).
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AE-30	Type 40 Desk Monophone—2500-ohm ringer.
AE-31	Type 50 Wall Monophone—1400-ohm ringer.
AE-32	Type 50 Wall Monophone—2500-ohm ringer.

Above instruments can be supplied with "battery-saver" hookswitch latches, if specified.

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thout an additional penny
Box contains everything else
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battery may be used instead.
worthy companion for either

vide modern, attractive and
and also prepare for future
and Type 40 and 50 Mono-

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PRODUCTS and SUPPLIES

the New Products Showcase

New Products & Supplies of Practical Interest

In this section you will find many items of materials, tools, and equipment that are used in, or are useful to the telephone industry. New models and improved designs have been collected by TELEPHONE ENGINEER AND MANAGEMENT. Each item presented warrants your close attention. If further information is desired, simply write our NEW PRODUCTS EDITOR and complete details will be forwarded.

New Hand Vise Holds Small Pieces Tightly

To make handling of small parts and pieces easier and safer for both bench and production jobs, the Chicago Tool & Engineering Company has introduced a new aluminum hand vise which grips

Palmgren No. 15 Hand Vise

solidly, yet will not mar or scratch the work. Only 7 oz. in weight and 5 in. long, it is light and comfortable to hold.

The 1½" wide jaw faces, which open to 1½", are accurately machined to provide a true surface. Made of aluminum, they are sufficiently softer than most pieces held to provide a "Velvet Grip" that prevents the jaws "biting" or marring the work.

Known as the Palmgren No. 15 Hand Vise, it is ideal for use by tool and die makers, repair, school and home workshops and others handling any small pieces. Now in volume production, full information can be obtained by asking for Bulletin No. 150 from TELEPHONE ENGINEER & MANAGEMENT'S New Product's Editor.

National Electric Products Announces New Fittings

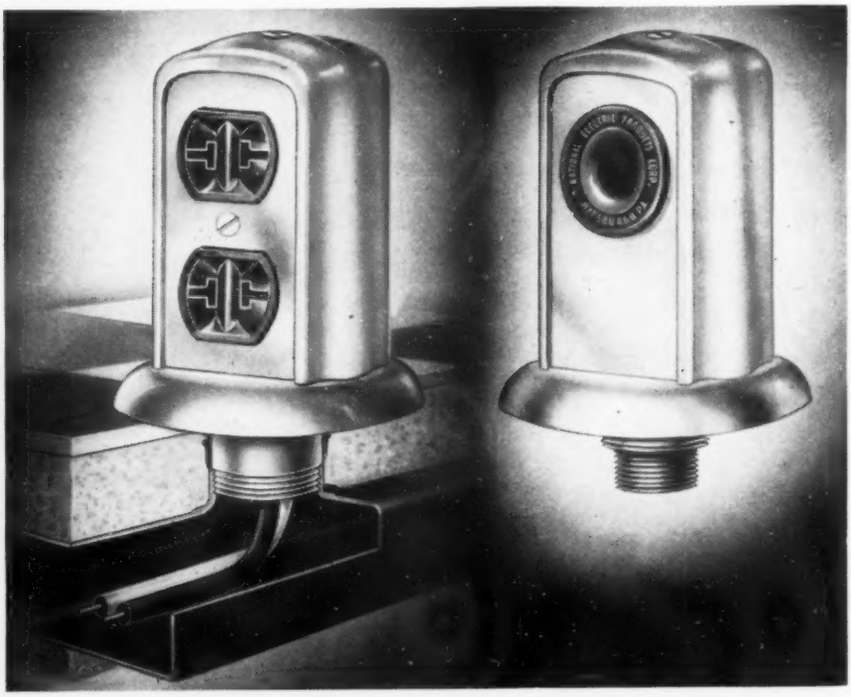
Two new service fittings for high and low potential wiring designed expressly for use with the company's underfloor wiring duct have been announced by National Electric Products Corporation, Chamber of Commerce Bldg., Pittsburgh, Pa.

Service Fitting No. 7903, with its standard duplex T-slot receptacle, is to be used for high potential light and power wiring. Telephone, buzzer and inter-communication low potential wiring in plant offices and office buildings are serviced at the floor level with Service Fitting No. 7904. Both models are component parts for the Nepcoduct underfloor wiring distribution system. Of the same general appearance and construction, the service fittings are adapted to screw into standard outlets of the underfloor duct.

In keeping with the trend to office interior improvement, the service fittings are stamped from heavy brass into units with cleanline, streamlined contours, and satin smooth brushed brass surfaces.

Either model is quickly wired and assembled with a single screw through the housing top assuring minimum assembly time and maximum rigidity of the fitting. The one-piece housing double locks in the flange base, eliminating the possibility of shearing-off the wires.

No. 7903 can be furnished with 3-pole twist-lock receptacles instead of standard duplex, when specified. Telephone or signal wiring issues from



RIGHT—Service fitting 7903; LEFT—Service fitting 7904.

No. 7904 through a rounded composition bushing.

Illustrated installation suggestions are included in the individual shipping containers.

◆

New Ohm's Law Calculator Offered by Ohmite Company

A new pocket-size Ohm's Calculator incorporating a number of new features has just been announced by Ohmite Manufacturing Co., 4937 Flournoy St., Chicago, manufacturers of electrical rheostats, resistors, and tap switches.

The new calculator, like the previous Ohmite calculator of which close to one-half million copies have been distributed to engineers, students, and

New Ohm's Law Calculator

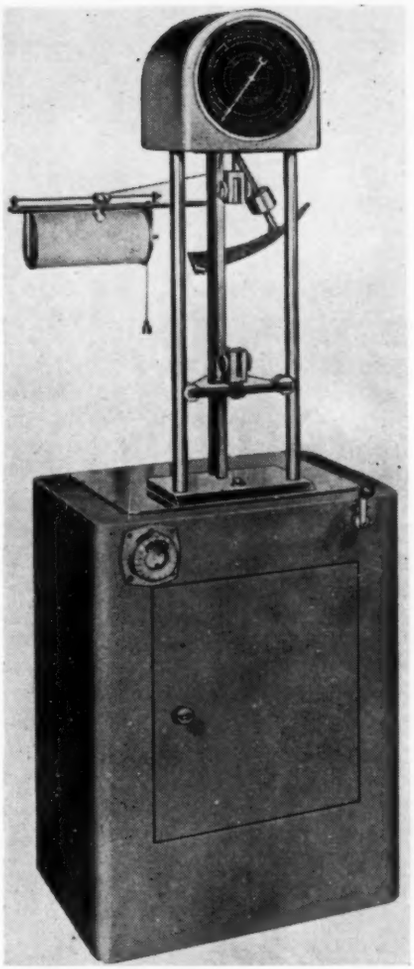
teachers, provides a simple and handy means of solving resistance calculations. With one setting of the slide it gives the answer to any Ohm's Law problem—reading directly in ohms, volts, amperes, and watts. It will also solve parallel resistance and series capacitance problems, and will multiply, divide, and find squares and square roots. The range covers all currents, resistances, voltages, and wattages commonly encountered in industrial and radio work.

All computing scales of the new calculator are printed on one side. On the opposite side are given the Composition Resistor Color Code and the catalog number of stock resistors and rheostats of various resistance values. The new calculator is made to handy pocket size (9″ x 3″) of heavily varnished cardboard, and is priced at 25 cents.

◆

Dillon Announces New Low Range Tester

The W. C. Dillon Co., Inc., has announced production of the New Dillon Low-Range tester. The new tester is expressly built for the physical testing of lighter materials or small finished items. It has four separate capacities incorporated, each available instantly, and shown individually on its large dial. These ranges are: 0-10 pounds in 1 ounce dial divisions, 0-25 pounds in 2 ounces, 0-50 pounds in 4 ounces, and 0-100 pounds in 8 ounces.



New Dillon Low Range Tester.

Its lower grip travel is *continuously variable*, or stepless, from 0″ to 19″ per minute. It also has: ½ of 1% accuracy, pendulum action, max-load reading, featherweight and swivelled upper grip, stroke limiting switches, forward-reverse switch, elongation gauge, stress-strain recorder, and numerous other valuable features.

Overall height is 63 inches, net weight 162 pounds. Not only does it combine all the musts for a low-range tester, with simplicity of operation and beauty of design, but it is also priced low, within the budget of both large and small shops and laboratories. Its forerunner and companion tester of higher capacity, the Dillon Model K, is already in hundreds of foremost industrial and laboratory uses. Those seeking similar versatility in the field of ounces and pounds will welcome this new low-range universal tester.

◆

Brown-Crane Announces New Wire Recorder

Brown-Crane Wire Recorders, Inc., 1340 West Washington Bldv., Chicago 7, Illinois, are announcing the new Brown-Crane Portable Wire Recorder. The manufacturer states that the fidelity of this machine is equal or superior to that of conventional recording devices, as proved by the Armour Research Foundation who license the Brown-Crane Wire Recorder.

The simple mechanical design eliminates wire breakage, the most important feature of a wire recorder. The recorder has a frequency response of 50 to 6,000 cycles at two feet per second wire speed. High speed drive pulleys provide for ultra high fidelity recording (four feet per second). At this speed, through use of an auxiliary speaker, a frequency range of 40 to 8,500 cycles is possible.

The tone control compensates for variations created by acoustical conditions. Two input channels for microphone and phonograph or radio are furnished with individual volume control on phono-radio input, which with recording volume control provide for proper mixing.

The Brown-Crane company will forward complete information upon receipt of your query.

◆

Ansul Chemical Announces New Fire Extinguisher

Greatly increased fire-stopping power is one of the many advantages claimed for the new Ansul-Dugas dry chemical fire extinguishers announced recently by the Fire Extinguisher Division of Ansul Chemical Company, Marinette, Wisconsin.

Other important features claimed are: Simplified and faster operation, quicker and easier on-the-spot re-

Ansul-Dugas Dry Chemical Fire Extinguisher.

charge, greater heat-shielding protection for the operator, expert extinguishing by inexperienced operators and greater capacity without increased weight.

On the basis of numerous tests by impartial authority, these new extinguishers have been given highest ratings for fire fighting effectiveness, according to the manufacturer. They are listed and approved by the Underwriters' Laboratories and Factory Mutual Laboratories.

◆

American Coach & Body Presents Improved Aerial Ladder

The new American Improved revolving aerial ladder, manufactured by The American Coach & Body Company, Cleveland, Ohio, maintains uniform balance regardless of angle

American Coach & Body Aerial Ladder.

through use of a new method of counter-balancing which eliminates the heavy deadweight. The ladder is so easy to raise or lower, a child can do it with one hand.

The ladder has 40 spotting positions in 360° and can be revolved in 41" circle.

The ladder can be mounted on any size truck. The most efficient use can be obtained if the body is at least 46" wide on the inside, so that when the ladder is at 90° to the body it will clear most any obstacle such as parked cars and yet permit the operator to mount the ladder conveniently.

The ladder has dozens of uses, maintenance work, trimming trees, reaching inaccessible places, inspecting cables and trolleys and is universally used by power, telephone, transportation and other utilities.

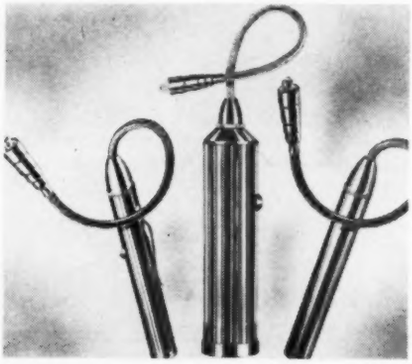
◆

New Flex-Lite Scores Hit In Telephone Industry

Unique in the field of flashlight equipment is the announcement of a new series of "Flex-Lites," manufactured by the Aero-Motive Manufacturing Company, Kalamazoo, Michigan.

In the three new models, it is reported, --the Junior, Junior Deluxe, and Master Flex-Lites—each have a long flexible extension bulb-retainer which replaces the conventional bulb assembly. With this unique, new construction feature, a powerful, searching beam of shadowless light can be introduced into heretofore inaccessible areas, it is claimed.

Made of polished aluminum, they are lightweight and sturdy. The Flex-Lites are waterproofed, it is stated, and can be



New Flex-Lite.

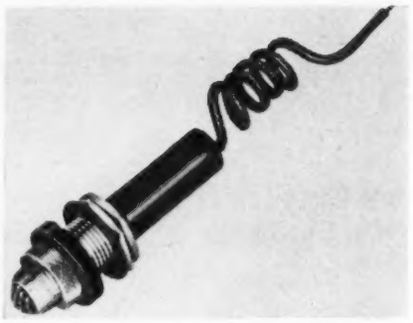
immersed in water without shorting. The Junior model with screw type switch in base and Junior Deluxe model with convenient pocket clip and thumb type sliding for positive contact.

The Master model, 16½ inches, overall, uses two regular size flashlight batteries, and also has thumb type switch. Handy for carrying in tool boxes, automobile glove compartments, or other kits, it is said this new series has a wide use in industrial plants, garages, homes and for many other general utility purposes.

◆

Compact Self-Flashing Pilot Light

This new pilot light indicator can be used in practically any circuit requiring a visual indicator and incorporates a self-timing flasher which causes the light



Self-flashing pilot light.

to blink at a rate of 60 to 80 times per minute when lighted.

The entire assembly including timer, lamp and housing is extremely compact —3½" long with flange diameter of 1-¼". It mounts on any panel in a single 13/16" diameter hole; has a threaded shank with ¾"—16 nuts to clamp the panel. The housing is entirely of bakelite.

Flashing action is produced by a sealed, glass enclosed thermal unit of the hot wire type which provides a positive snap action make and break. The thermal element is designed for extremely long life but can be replaced as easily as changing a fuse. The unit is unaffected by shock, vibration, dust or corrosive fumes.

Current consumption of the complete unit, including lamp, is only 200 ma. It operates on direct current to 32 volts or alternating current to 125 volts. On 125 V AC an external resistor of 500 ohms, 25 watts rating is required.

Because this unit is no larger than most ordinary panel lights but offers the extra advantage of attention attracting flashing action, it is finding rapid application in widely diversified electrical fields. No external relay or resistance wound bimetal strip is required.

The unit described is a product of the Engineering Associates, 380 Main Street, East Orange, N. J. For further information write TELEPHONE ENGINEER'S New Products Editor.

◆

New Improved Boring Bar Set

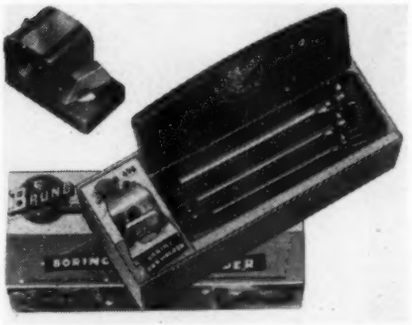
A new Bruno Boring Bar Set and Holder Kit is announced by Bruno Tools, Beverly Hills, California, manufacturer of a complete line of precision cutting tools for home and industrial uses.

The new kit, designated as No. 650, consists of Adjustable Boring Bar Holder No. 600 and Boring Bar Set No. 559, complete in an attractive two-color picture box.

The Adjustable Boring Bar Holder has a capacity of 3/16" to 3/4". Its

exclusive V-Channel grip is instantly adjustable and securely grips round, hex, square and out-of-shape bars as well as drills, reamers and chucks without the use of adaptors, bushings, or attachments, always holding bar or tool on exact center. The holder is of heavy duty, precision construction and is easily installed on any 9" or 10" swing lathe. Centering height is 1-3/16" and bottom may be faced off for height adjustment.

The Bruno Boring Bar Set No. 559 comes in an attractive plastic protective case and consists of ¼", ⅜" and ½" boring bars, each with the exclusive Bruno Lever-Lock grip which clamps



Bruno Boring Bar Set and Holder Kit.

the bit with equal pressure along the entire holding channel and the full diameter of the bar. Thus the threading bit or boring bit may be securely gripped at the extreme end of the bar without interfering set screws or bolts, permitting boring or threading to the bottom of a blind hole with full clearance.

Each bar has one precision ground high speed steel threading bit and one blank high speed steel bit. Bits are given special deep-freeze treatment for longer life.

◆

New Economy Digger Proves In On Tests

Early in 1946 the designer of the Economy Digger built the two machines for his own use in contracting pole line construction for various power companies and contractors in the upper Midwest area.

The performance of the digging machine was successful to the extent that contractors, R.E.A. managers, power companies and telephone men who had occasion to see the digger in operation often requested the builder to build a machine for their use. These requests resulted in the manufacture of the economy digger.

The maximum performance of this type digger for one day of operation was

GraybaR
TELEPHONE SUPPLIES
BULLETIN

Whitney Blake TELEPHONE WIRE

When you want drop wire, bridle wire, or inside, jumper, or duct wire, there just isn't any point in using anything but Whitney Blake. For this line — made of top-quality materials, including Teleprene and Plastite insulations — really has "been through the mill" of laboratory and field tests . . . and has come through with superior ratings in all characteristics!

W-B wire is one of the hundreds of telephone supplies which Graybar distributes. They're *all* first-quality products of leading manufacturers.

Whatever your supply requirements, the easiest way to get them is to call our nearest office. A Graybar specialist can be of real help in solving any of your electrical problems. *Graybar Electric Company. Executive offices: Graybar Building, New York 17, N. Y.*
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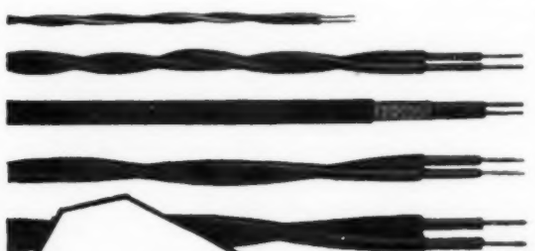

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Whenever you order anything electrical from Graybar, your requirements *do* receive the personal attention of our stockholders. Graybar is wholly owned by its operating personnel. That's one reason why Graybar people — together forming a huge, nation-wide organization — apply to each job the sense of personal responsibility you associate with a small, well run, *local* business.

reached on November 12th, 1946 in Sargent county, North Dakota. On this occasion two-1½ ton trucks equipped with the economy digger suspended from regular pole derricks dug 113 holes 6" deep by 16" diameter and erected 113--35 ft.-7 creosoted pine poles in the holes (not tamped) in 7 hours and 50 minutes. Four men, 2 men to each truck unit, performed this work on R.E.A. construction for the Martin Engineering Company, Fargo, North Dakota. At a later date a record of 81 holes, 4½-foot deep were dug (no poles erected). This was accomplished by one truck and two men in one day for the Minnesota Telephone Company on rural exchange property at Hayfield, Minnesota.

The economy digging machine is designed to operate from any truck equipped with derrick for pole raising purposes to drive the digging machine while suspended by winch line from the derrick.

The Economy Digger is built in two sizes; the conventional Economy 16 is built for all standard pole line construction, and the Economy 24 is built for heavy line construction where holes of 24 inches in diameter are desired.

The machine features a six-foot length auger which is telescopic on its center shaft making hole digging possible across fences and other obstacles without loss of time. It also features a telescopic tumbler drive shaft from truck to digger which permits digger to be in proper position for its work regardless of truck position on irregular ground.

After the hole has been dug the digger is pushed to the side of the completed hole, thereby freeing the winch line for other uses such as erecting the pole into the hole. The digger can be attached to the truck by two men. The machine is equipped with automatic clutch and anti-shock springs to fully protect the power take-off transmission while digging in rocky soils.

The builders of the Economy Digger invite your request for an informative bulletin which you may obtain by writing to the New Products Editor, TELEPHONE ENGINEER AND MANAGEMENT.

◆

Telex Develops New Electro-Acoustics Device

A new type of electro-acoustic device which is worn under the chin rather than over the head is molded of lightweight, tough Tenite plastic has been announced by Telex, Inc., Minneapolis, Minn. Designed like a stethoscope, the Telex Monoset has two hollow Tenite tubes stemming from a tiny round speaker and adjustable to the proper head width. The ends are tipped with clear Tenite ear pieces, which fit directly into the ears.

The Telex Movoset in operation.

The entire unit, including speaker and miniature plug-in cord attachment, weighs only 1.2 ounces. Ear pressure and head fatigue are thus reduced to an absolute minimum, making the set comfortable to wear for long stretches at a time. Tenite has low heat conductivity and hence, is always pleasant to the touch.

Accurate, high-fidelity reception is claimed for the set, plus ruggedness and durability. Tough Tenite, even in thin sections such as the two tubes, has excellent impact strength and is able to withstand sudden, hard blows.

◆

Indiana Associated Lets Contract for $650,000 Building

A $650,000 construction contract for the new automatic exchange and office building for the Indiana Associated Telephone Corp., at Elkhart, Ind., has been awarded, Lafayette headquarters of the company have announced.

The new building will be 107 by 88 feet. The first story will have granite exterior facing and the 2 top stories are to be of Indiana limestone. Reinforced concrete and fireproof construction will be used throughout.

STROMBERG—

crapo high-tensile line wire

Reduces Over-all Costs

A net saving of 10 to 15 or more pole structures per mile is possible where *Crapo* High-Tensile Telephone Line Wire is used in long-span construction. Fewer pole structures mean substantial savings in time, labor and material, and in maintenance.

Crapo HTL-135 makes possible spans of 350 feet in heavy, 450 feet in medium, and 500 feet in light loading areas. Its practical economy should be considered for new extensions and where old lines are to be replaced.

Crapo HTL-85 (No. 12 B. W. G.) permits spans of 225 feet in heavy, 325 feet in medium, and 375 feet in light loading districts; provides stronger spans on existing pole structures. Both wires possess superior telephonic transmission qualities.

Write for Manual of Engineering Data and Construction Practices for *Crapo* High-Tensile Telephone Line Wire!

STROMBERG—

BRANCH OFFICES: CHICAGO 6.

RG–CARLSON Recommends

for long spans *specify armstrong's glass insulators*

Tests in both field and laboratory have demonstrated that Armstrong's Glass Insulators are actually *stronger than their supporting pins!* This means that Armstrong Glass Insulators can be used on the longest practicable spans.

Manufactured by automatic precision machinery, these Insulators are checked every step of the way. From batch materials to finished product, they are under rigid chemical, microscopic, and polariscopic control to insure highest physical and electrical properties.

For the finest in glass insulators, specify Armstrong—used by leading communication systems throughout the world.

They conform to—or exceed—A.S.T.M. standards

sturgis standard no. 435-a

minimizes "chair fatigue"

Sturgis Chairs *take over* sitting strain! Maintaining best posture for operating with least muscular exertion, operators can recuperate quicker at rest periods from *actual* operational fatigues, minus—chair fatigue!

Height and depth *inter*-adjustments between Sturgis ample Saddle Seat (16½" wide, 14½" deep), and ample Plaited Backrest (8" high, 13" wide), are limitless and offer the equivalent of a *made-to-measure* chair to every operator.

Heavy welded steel tubing (1" O.D. for base, ¾" O.D. for footrest), makes Sturgis frames indestructible. Their hair-filled, genuine leather upholstery wears everlastingly.

Chair Height Specifications

Seat Height Adjustment	Footrest Height from Floor	Seat Height Adjustment	Footrest Height from Floor
18" to 22"	5"	24" to 28"	10"
20" to 24"	6"	26" to 30"	12"
22" to 26"	8"	28" to 32"	13"

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cook no. 3800

central office protector

Combines cable termination with protection of central office personnel and equipment against high potentials and sneak currents. In operation, it opens the switchboard circuit, grounds the outside line, and operates an alarm circuit. Note these construction and operating features:

1. Provides for temporary disconnect.
2. Self-soldering, low-resistance heat coils easily reset after operation without changing, reversing or re-soldering coils.
3. Line and switchboard connections on opposite sides of protectors.
4. Steel mounting plate for maximum strength.
5. Unit dischargers, consisting of two carbons, separated by acetate dielectric cemented together, permanently grounds the outside line under continuous discharge.
6. Easily tested without removing heat coil; withdrawal of test plug leaves protector in operating condition.

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STROMBERG Telephone CARLSON

Automatic Type Battery Chargers

(Continued from page 28)

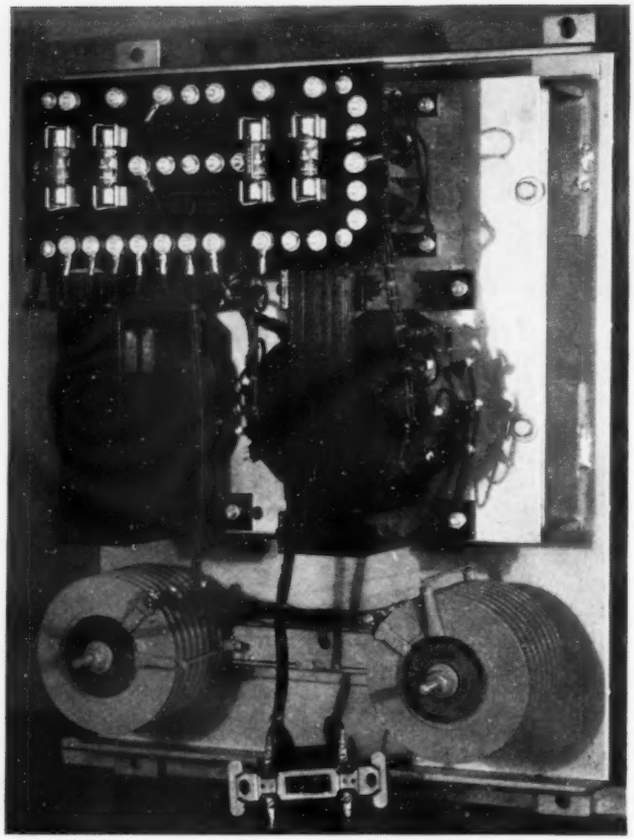


Fig. 12 — The North charger unit. The cover of this charger is removable, thus permitting easy access to the entire unit.

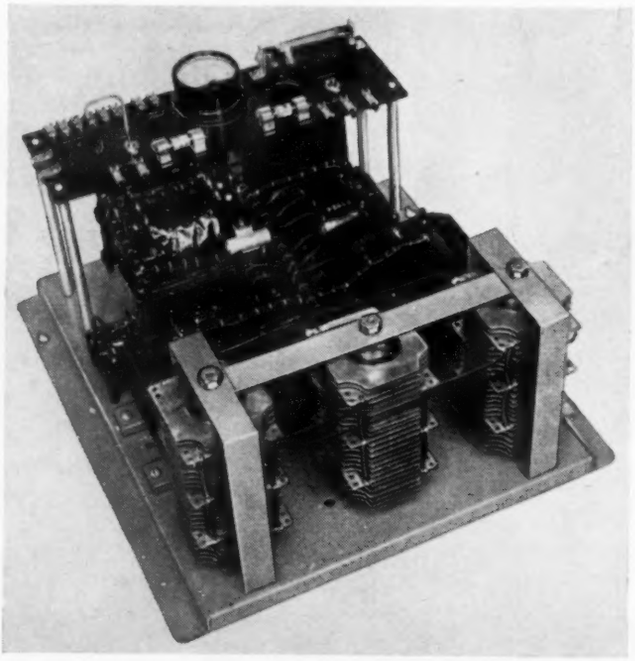
ates. A fully charged battery has a lower voltage at a high ambient temperature than one with a low ambient temperature and hence tends to be overcharged. The temperature compensating device corrects for this condition.

Referring to Figure 5, the operation of the automatic control equipment is as follows: The voltage control relay is controlled by the start adjustment and stop adjustment on the resistance network used with the heater resetting device. The closest adjustment enables a variation of as low as 0.1 volt per cell variation.

When the battery is fully charged, the voltage control relay opens the contacts shown at "A" in the diagram. These contacts remain open until the battery voltage drops as the result of the load applied across it. When the minimum battery voltage is reached, the voltage across the control relay and resistance network (stop adjustment and start adjustment) is insufficient to hold the control relay contacts open. Closing of these contacts causes the contactor relay at "B" to pull up and connect the charger to the power supply. The transformer then furnishes power to the copper-oxide rectifier which then starts charging the battery. At the same time power is supplied to the heater control device operating from a winding on the transformer. The heater control operates its contacts "C" to short out the start adjustment resistance. This sets the voltage control relay to operate when the maximum voltage of the fully charged battery is again reached and the cycle of operation is repeated.

The automatic temperature compensation device is built in with the voltage control relay and only operates as required in case of a high ambient temperature of the storage

(Please turn to page 58)



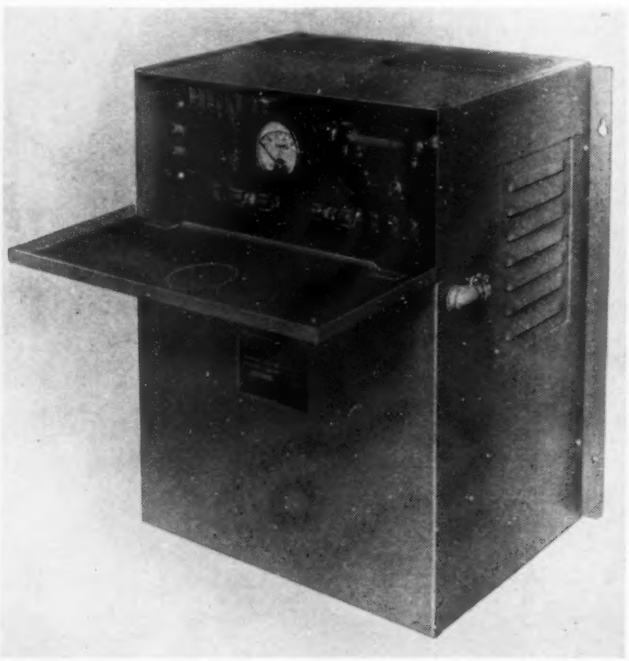
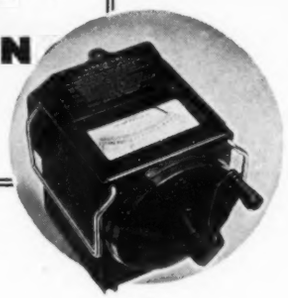


Fig. 9 (left)—Open view of Raytheon Manufacturing Company's RectiChargeR. Fig. 10 (right)—View of RectiChargeR with case in place.

"MEGGER"* INSULATION TESTER



*T. M. REG. U. S. PAT. OFF.

Whether in central office or out on the system, your "Megger" Insulation Tester is an unfailing detector of weakened insulation.

Simply turn the hand crank to generate 500 volts D.C. Read insulation resistance by pointer deflection. Always ready for use any time . . . anywhere . . . the new U. S. model in rugged plastic case weighs but 8 pounds. Telephone model has guard terminal and capacitance discharge switch. Write for Bulletin 1735-TE—today.

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INVEST YOUR "PIN MONEY" IN THE BEST

LOCUST PINS

Locust wood is practically impervious to decay and is impenetrable to moisture. Because of its close-grained hardness locust can be machined into strong, long lasting pins of standard specifications that can be counted on to retain their size and shape.

OAK BRACKETS

Oak pole brackets of unquestioned quality are in demand now as never before in the face of the qualifications necessary in the equipment and materials needed today to "keep 'em talking." Present day maintenance and repair have every reason to demand and get only the best.

GLASS INSULATORS

Research and experiment have produced in Hemingray insulators a glass insulator that is better than any ever before offered.

Non-porous, non-deteriorating, uniform coefficient of expansion and high mechanical as well as high dielectric strength are some of the many qualities that rank Hemingray the "best on the line."

BUCKEYE TELEPHONE and SUPPLY CO.
COLUMBUS 6, OHIO

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FOR OVER 50 YEARS

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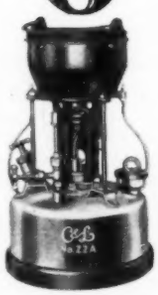
FIRE POTS
AND BLOW TORCHES



No. 22-A

C&L Fire Pots have every quality required to make them efficient, durable and convenient. They are substantial, rugged and compact.

For more than half a century C&L Fire Pot has been recognized as the leading fire pot in the industry. Skilled workmanship and research engineering have combined to produce multiple-use fire pots that can take it—under any conditions.

Distributed through leading jobbers everywhere.

CLAYTON & LAMBERT MFG. CO.
1709 DIXIE HIGHWAY • LOUISVILLE 10, KENTUCKY

Popular
The World Over!

T. F. A. SERVICE METERS

About 2 millions of T. F. A. type service meters are installed practically all over the world. It is the standard service meter of the British Post Office and is used exclusively by the Danish Post Office, Copenhagen Telephone Company and by a number of Government Administrations and private telephone companies.

Small in Size—144 per square foot—Safe in Operation! Digits of T. F. A. Service Meters are clearly visible and photographic recording may be used. Number wheels are actuated on release of armature. No lubrication is needed for meter. Meter may be provided with make or break contact actuated by armature.

For Complete Information Write

TELEFON FABRIK AUTOMATIC A/S
Amaliegade 7, Copenhagen

$600,000 Expansion Program for Southeast Missouri Company

THE GRADUAL conversion from manual switchboard operation to automatic exchange, now underway in the smaller communities served by the Southeast Missouri Telephone Company, Cape Girardeau, Missouri, is expected to reach Cape Girardeau within the next five years.

Revealing the future plans for an automatic system in the city, President C. W. Boutin said that with it will come a construction program which will double the present size of the company's home office. Under the present plan two additional stories will be added to the building to house the new equipment and to care for company expansion.

Although iron wire and telephone poles still remain on the critically short list, Mr. Boutin said that the contemplated construction program for 1947 calls for expenditure of an estimated $600,000. Included in this is erection of a new exchange building at Poplar Bluff, now underway, to cost approximately $100,000 and installations in it of $142,000 worth of automatic equipment.

Another new building is to be erected at Chaffee, where automatic service will also be installed. There will also be small buildings constructed at Wyatt and Lilbourn and at Tamms and Thebes in Illinois, all with automatic service operating through the exchanges. Mr. Boutin said the company is converting to automatic as rapidly as possible. Nine exchanges in the district now have the automatic equipment.

Plans for Cape Girardeau improvements in 1947 call for the installation of four new switchboard sections, creating 12 new operator positions. These will probably arrive by March 1, Mr. Boutin declared. Their installation will considerably relieve the burden which has been placed on present switchboard equipment, now handling 300 extra lines within the city.

By June, he said, it is expected that another group composed of two physical circuits, can be added from Caruthersville to St. Louis in addition to a number of new circuits. These latter will include new circuits between Cape Girardeau and Sikeston and between Sikeston and New Madrid and Sikeston and Portageville.

Among buildings which are to be constructed in the future, but for which no time has been set, is one for Charleston, Mr. Boutin reported.

The 1946 construction program of the company brought a gross expenditure of $521,628 for buildings, new lines and equipment of all types. Three new exchanges were added during the year at Bell City, Wardell and Holcomb, all with automatic telephones. These were previously served by other offices. Increasing the number of lines in the district, the company spent $34,528 for new toll service in 1946.

◆

Lima, Ohio Company Tests Mobile Radiotelephones

Mobile radio telephone service, has been introduced in Lima, Ohio by The Lima Telephone & Telegraph Co.

Two automobiles equipped with receiving and sending equipment recently marked the beginning of a period of experimentation by which Lima

It's an important question . . . and the final answer will depend, to a large degree, on the over-all efficiency of the organization that handles your directory advertising sales. The Loomis staff is scientifically trained to obtain increased revenue for you . . . through an ethical, carefully guided program that creates a friendly, favorable attitude toward your company.

Wesley H. Loomis, III, President, and Roland T. Beard, Vice-President, 520 Gettle Bldg., Ft. Wayne, Indiana, cordially invite your inquiry.

Loomis ADVERTISING COMPANY

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506 Olive St., St. Louis 1, Mo. 20 West 9th St. Bldg., Kansas City 6, Mo.
6908 Market St., Upper Darby (Phila.) Pa.; Omaha Nat'l Bank Bldg., Omaha 2, Neb.

Sample of things to come. W. H. LEE, of the Miami Office of The Keyes Company, Florida's largest Realtors, keeps in touch with office and home by radio-telephone installed in his car.

telephone engineers hope to improve on the mobile service developed in other cities.

If these experiments are successful, Lima will perhaps be the first city to provide direct dial telephone service to and from automobiles without the aid of a radio operator, according to George B. and Frank T. Quatman, president and assistant, respectively.

The Lima telephone company has been working on these plans since the end of the war.

In general experiments over the country, the mobile service operates similarly to that of a police car. The telephone user in an automobile reaches a radio operator who completes the connection for him. Likewise the public, desiring to talk to an occupant of a car, would contact the radio operator for a connection.

Engineers at the Lima Tel. & Tel. Co. are attempting to go this idea one better. They want to make it possible for a telephone user in a moving motor vehicle to dial any telephone in the area or to receive a call from anywhere in the community without the aid of an intermediate radio operator.

The company has obtained a license from the Federal Communications Commission to install such a service. A 10-day period of experimentation began recently, after which 30 more days will be allowed by the FCC for trying out new developments.

If there is no interference with other radio services, or other objection, the Lima company will then be permitted to continue under license for one year.

Long range planning for mobile highway radio-telephone service, according to Lima company officials, is aimed toward making possible long distance calls to a car anywhere in the U. S., equipped with radio, by contacting an operator in the city nearest to which the vehicle is believed to be located at the time.

In addition to carrying a telephone receiver-transmitter instrument similar to those on the handset home or office phone, and a dial, the two cars in use are equipped with selector unit, receiver and transmitter set into the trunk compartments.

On the third floor of the Lima telephone building are the receiver and transmitter The antenna is on the roof.

The equipment is of the frequency modulation type, and carries a wavelength of 152.63 megacycles for the main station, 157.89 for the mobile units. This is a new band only recently opened by the FCC.

◆

E. D. Hicks Dies

E. D. Hicks, 80, who pioneered telephone development in Oklahoma, died February 9 in a hospital at Tahlequah, Okla. With two partners in the summer of 1886 he installed the first telephone in the state, between Tahlequah and Muskogee. With Judge William P. Thompson, he installed a telephone exchange at Tahlequah in 1896.

CHANCE PIKE POLES with REVERSIBLE "SAFETY POINT"

CHANCE Pike Poles have these Extra features:

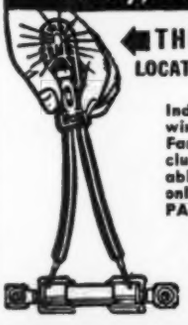
Wire lift attachment can be inserted in same ferrule.

- Point can be reversed and inserted into ferrule. No sharp projection.
- Worn points can be replaced.
- Spiral tip holds without slipping.
- Choice fir poles, lacquer finished, with reinforced butt.

A·B·CHANCE CO. · CENTRALIA MISSOURI

Test-O-Lite

TESTS ANY VOLTAGE... 100 to 550 Volts, A.C. or D.C. Safely, Swiftly, Surely



THE NEON GLOW LOCATES TROUBLE INSTANTLY

Indicates hot or grounded wires. Tells AC from DC. Far superior to ordinary clumsy test bulb Indispensable in shop or home. The only pocket-size tester with PATENTED SAFETY FEATURE.

Life-time guarantee. Purchase thru electrical dealers. Pat. No. 1,778,883.

RTC-2 VINCENT RARE GAS RELAY

for harmonic or coded bells. Dual purpose device which economically improves both ringing and transmission on party lines. NO MOVING PARTS. Fully guaranteed. Can be installed in a minute.

L. S. BRACH Mfg. Corp.

200 Central Avenue Newark, N. J.

U·S·S AMERTEL gives you

- HIGH TENSILE STRENGTH
- HIGH CONDUCTIVITY
- HIGH CORROSION RESISTANCE

• High tensile strength with high conductivity has been the goal of telephone wire makers for years. U·S·S Amertel 85 and 135 combine both these advantages with superior resistance to corrosion.

In addition, the use of PFT Armor rods reduces the effects of vibration so that breaks from this cause are practically eliminated.

The tensile strength of Amertel 85 is approximately 90% greater than that of "E.B.B." grade and the tensile strength of Amertel 135 is 250% greater.

The effective resistance at voice frequencies for Amertel 85 and 135 is approximately the same as that of the best grade of iron wire.

Superior galvanizing assures better bonding of zinc with the metal base and results in considerably longer service life.

This combination of properties of U·S·S Amertel Telephone and Telegraph wire makes it suitable for longer spans with less danger of breaks.

American Steel & Wire Company

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco,
Pacific Coast Distributors

Tennessee Coal, Iron & Railroad Company,
Birmingham, *Southern Distributors*

United States Steel Export Company, New York

UNITED STATES STEEL

Look for this tag

It is your assurance of highest quality.

AMERICAN STEEL & WIRE COMPANY
USS Amertel
TELEPHONE AND TELEGRAPH WIRE
UNITED STATES STEEL

THE NEW TURNER

Low Pressure FIRE POT

NEW IN PRINCIPLE, DESIGN, AND PERFORMANCE

WITH "CARBURETOR CONTROL"

Features the exclusive *adjustable* air syphoning tube which enables the pot to operate at a pressure of only 20 to 30 pounds as compared with 40 to 60 pounds for old style models. Tube can be moved back and forth in the burner . . . permits instant balancing of the gas and air mixture by actually syphoning air from the outside to meet widely varying fuel and job conditions. Important because it means more perfect combustion . . . a more intense flame, concentrated at the proper point and not distributed over the entire coil . . . eliminates carbonization . . . insures longer coil life!

Turner No. 275 Fire Pot will melt 20 pounds of lead in 3 minutes; has fuel capacity of 9 pints; takes 6" melting pot.

COMPARE THESE FEATURES

Flame control valve adjusts the flame to any desired heat . . . is complete with stainless steel orifice cleaner needle which automatically cleans the orifice thereby eliminating need for separate cleaner wire.

★

Construction assembly permits quick, easy accessibility and cleaning . . . windshield, top plate, and bail handle are one unit, and can be lifted from tank in five seconds by loosening one wing nut. This construction also provides the sturdy support necessary to carry a heavily loaded pot of lead, and is far superior to the old style upright posts.

★

Burner coil is made of extra-heavy seamless steel tubing . . . is protected by sturdy outer jacket that maintains heat without overheating . . . can be generated and used in heavy wind.

★

Tank is of unusually strong construction . . . has heavy protector ring on bottom, large funnel-filler cup, new style wide-seat filler plug and protective dust cap, large drip cup and an overflow cup, heavy blow-proof brass pump.

Reasonable Delivery

THE TURNER BRASS WORKS

SYCAMORE ILLINOIS

Since 1871

Electronics Developments Considered At IRE Convention

Convening to consider problems ranging from latest electronic developments to professional status, an estimated seven thousand radio engineers attended the 1947 annual convention of The Institute of Radio Engineers at the Hotel Commodore and Grand Central Palace building March 3-6.

More than 120 technical papers were read covering all fields of radio and electronics, including such allied fields as radiography, particle accelerators for nuclear studies, and nucleonics instrumentation, in addition to technical committee sessions and other convention functions.

Charles E. Denny, chairman of the Federal Communications Commission, was the featured speaker at the annual banquet, March 5, in the grand ballroom of the Hotel Commodore.

Frederick R. Lack, vice-president of Western Electric Co., acted as toastmaster.

◆

Wm. L. Mollands Advanced by Stromberg

William L. (Moon) Mollands has been elevated to the position of manager, telephone sales—Atlanta office will take over his new duties immediately in Atlanta, Ga., according to an announcement by T. C. (Tommy) Thompson, Stromberg-Carlson telephone sales manager.

Mr. Mollands will supervise the Stromberg-Carlson sales force in the states of Florida, Louisiana, Alabama, Mississippi, Virginia, North and South Carolina, and parts of Georgia, Tennessee, and West Virginia. He traveled formerly in the southeastern section of the country.

Mr. Mollands, who joined Stromberg-Carlson in 1923 as a wireman in the factory switchboard department, has successively been an installer, subforeman, service department manager, and salesman. During the war he spent a year supervising radar test equipment when the company was engaged in government radar work.

◆

New System Planned For Mt. Vernon, S. D.

Plans, growing from a recent meeting of a committee representing the former subscribers of the Mt. Vernon (S. D.) Telephone Company, have been laid to institute an entirely new telephone system.

It was brought out that no major improvements have been made in the system in more than 40 years.

New! BRIDLE WIRE
of Famous TELEPRENE Construction

TELEPRENE BRIDLE WIRE,
a suitable running mate for
TELEPRENE DROP WIRE, is now available
with *LongLife* NEOPRENE jacket with
No. 18 Soft Copper Teleplated Conductor.
(2 Conductor Wire, Whitney Blake Cat. No. 18 TBC-2)
(3 Conductor Wire, Whitney Blake Cat. No. 18 TBC-3)

New installations are now being made with this New Trouble Free Bridle Wire.

For MODERN systems that "Stand the Gaff" specify The Whitney Blake unbeatable combination.

- TELEPRENE DROP WIRE
- TELEPRENE BRIDLE WIRE
- PLASTITE { INSIDE / JUMPER / DUCT } WIRES

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Call GraybaR

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THE WHITNEY BLAKE CO.
New Haven, Conn.
Well Built wires since 1899

General Akin Succeeds Ingles As Chief Signal Officer

BRIGADIER GENERAL Spencer B. Akin, who has the most distinguished and continuous record of combat service of any Signal Corps general officer in World War II, was nominated February 5 by President Truman to be Chief Signal Officer of the Army for the next four years, commencing April 1, with the rank of Major General.

General Akin succeeds as Chief Signal Officer, Major General Harry C. Ingles, who is retiring on March 31 after 37 years in the Army. General Ingles guided the Signal Corps during the crucial years of World War II as the communications agency of the Army.

General Ingles' leadership involved many diverse responsibilities during the war, including the development, supply and maintenance of billions of dollars in communications equipment, the training of thousands of communications and photographic specialists and the installation and operation of the Army Command and Administrative network which, at the height of the war, embraced more than 800,000 circuit miles of radio, telegraph, telephone and submarine cable networks. Both during and since the end of the war, General Ingles placed special emphasis on the Signal Corps research and development program. General Akin will undoubtedly carry on this research policy and plan, as he headed the Research Section in General McArthur's staff during the Pacific war.

General Akin's service in World War II covered the entire war against the Japanese as the Chief Signal Officer to General McArthur. Serving entirely in the combat zones, he was with General McArthur from the summer of 1941 during the battles of Bataan Peninsula and Corregidor and escaped with General McArthur on that famous and heroic trip on the PT-boats to Australia.

Since the victory over the Japanese, General Akin has been serving as the Chief of Civil and Postal Communications in the military occupations of Japan on the staff of General McArthur, the Supreme Commander of the Allied Powers in the Pacific. General Akin has likewise held the post of Chief of the Signal Intelligence Service and of Radar Counter-Measures Service in the Far East, the Southwest Pacific Area and the Army Forces of the Pacific.

MAJ. GEN. H. C. INGLES retires March 31 after 37 years in the Army. He will be succeeded by BRIG. GEN. SPENCER B. AKIN.

In addition to his service throughout the entire Pacific war against Japan, General Akin established and became Chief of the Research Section of General Headquarters of the Southwest Pacific Area. He was appointed Brigadier General (temporary) on Dec. 18, 1941, and Major General (temporary) on Nov. 3, 1943. He reverted to the rank of Brigadier General (temporary) on May 1, 1946, and now becomes Major General with the post of Chief Signal Officer.

In the fact that he has three of the Army's highest decorations for gallantry in action, the new Chief Signal Officer has an outstanding record as a general officer. He won the Distinguished Service Cross for his gallantry in the defense of the Philippines and Corregidor. He was awarded the Silver Star for gallantry in action on December 23, 1942, when he reorganized a platoon of Infantry under enemy fire in repairing a strategic bridge near Buna, New Guinea, and then crossed the bridge in advance of the Infantry to capture a highly important Japanese airfield. In 1944, General Akin was given the Oak Leaf Cluster to the Silver Star for gallantry in action in the recapture of the Philippines. After V-J Day, he was also awarded the Air Medal for gallantry and contribution to the successes of the U. S. Army Air Forces during the Pacific fighting.

STROMBERG—

for unsurpassed performance . . .

kennecott paper-insulated lead-encased telephone cable

Kennecott Telephone Cable is made with conductors of from 16, 19, 22, 24, and 26 AWG.

Each wire is insulated with one or more wraps of manila paper, or paper made from clear rope stock with suitable proportions of wood pulp or cotton rag stock added.

The paper is wound loosely in helical form around the wire. When two or more papers are used, they are applied in reverse direction.

Dry paper is used because of its low specific inductive capacitance, which is further reduced by the air space introduced by the loose wrapping.

After insulation of the conductors, they are twisted together to form pairs, each wire of a pair being wrapped with paper of a different color for tracing purposes.

The twisted pairs are cabled together in layers, each layer being one pair thick. Alternate layers are cabled in opposite directions. The completed cable core is taped over with paper.

After removal of moisture by heat, the cable is then sheathed with lead containing 1% antimony.

STROMBERG—

BRANCH OFFICES: CHICAGO 6.

RG—CARLSON Recommends

prevent overtension with the

dillon dynamometer!

Available with calibrations from 500 lbs. to 20,000 lbs.

Your best protection against costly and troublesome wire failures due to overtension is the use of a handy and durable Dillon Dynamometer, the finest load measuring instrument of its type available.

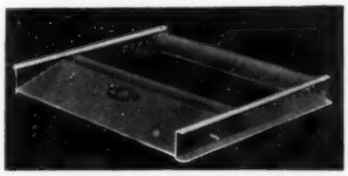
Neither heat, cold, nor accidental overload affect the accuracy of its readings. It may be used in any position, with the load applied from any angle. It permits immediate readings on the job, with a minimum amount of time and trouble.

- Dial easy to read even at a distance.
- Commercial tolerance guarantee is 2 per cent. plus or minus *full scale reading.*

speed *reel-handling with* roll-a-reel

Handling heavy reels of wire, cable, steel strand or rope becomes amazingly easy, economical, and safe with Roll-A-Reel. This essential device saves time and money, both in the warehouse and on the job. Sturdy and simple, with "Tip-Toe" operation, it makes unloading or loading reels as easy as handling a spool of thread.

- Heavy gauge steel frame, capacity up to 2,000 lbs.
- Light-weight and portable; strong ball-bearing rollers.
- Low, slanted front for easy loading and unloading, eliminating use of jacks or other troublesome devices.
- Simple, positive roller lock makes reel removal easy.
- Width 30", depth 28", height 3½", weight 50 lbs.
- Stands upright in any end position for safety, convenience.
- Rear roller can be adjusted immediately for any reel size.
- Built for years of trouble-free service.



STYLE A—FOR REELS UP TO 28" WIDE

Also available in Style B for 2 reels 24" wide, or one reel 48" wide. Capacity 4,000 lbs.

subscriber service improves with sturgis standard

Calm, unruffled subscriber service prevails when operators are mentally and physically well-poised.

Operators call the Sturgis No. 435-A "comfortable", unconsciously recognizing that it conserves their vitality. True, its ample Saddle Seat (16½" wide, 14½" deep), and ample Plaited Backrest (8" high, 13" wide), spell comfort. But their infinite capacity for interadjustment in height and depth to correctly posture operators of every type of figure is their pay-off.

Heavy, welded steel tubing (1" O.D. for base, ¾" O.D. for footrest), makes Sturgis frames indestructible. Their hair-filled genuine leather upholstery wears everlastingly.

Company, operators and subscribers profit from Sturgis correct design.

Chair Height Specifications

Seat Height Adjustment	Footrest Height From Floor	Seat Height Adjustment	Footrest Height From Floor
18" to 22"	5"	24" to 28"	10"
20" to 24"	6"	26" to 30"	12"
22" to 26"	8"	28" to 32"	13"

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STROMBERG Telephone CARLSON

—Two KWIK-HEAT Built-in Thermostatic irons, 225-watt and 450-watt, plus our low cost KOPPERKORE 100-watt iron. The Kordless KWIK-HEAT facilitates production of small work. See KWIKHEAT demonstrated at your Radio, Electrical or Hardware distributor, or write for data:

HOT IN 90 SECONDS

JOSLYN HARDWARE

PLAY SAFE
ORDER NOW

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HAVE IT
WHEN
YOU NEED IT

☆ ☆ ☆

Distributed by

SUTTLE EQUIPMENT CO.
LAWRENCEVILLE, ILLINOIS

DEPEND ON
SUTTLE

Automatic Type Battery Chargers

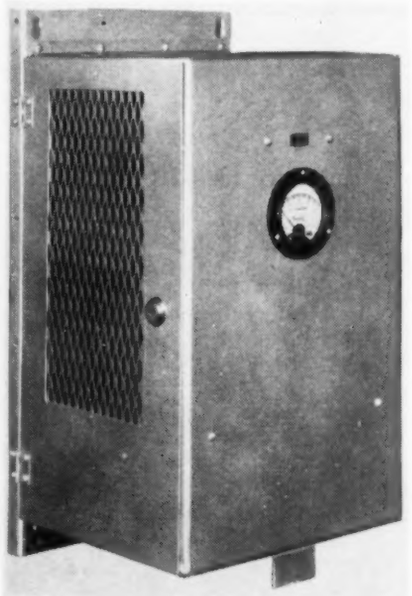
(*Continued from page 50*)

battery that would cause the battery to become overcharged.

Magnetic Control In Automatic Battery Chargers

THE AUTOMATIC battery charger produced by the Raytheon Manufacturing Company is controlled entirely by magnetic means, no relays or other moving parts being required. A direct current stabilizer and an alterating current stabilizer are incorporated in the charger to enable this unit to "follow the load" at all times.

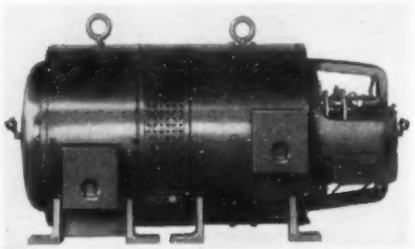
The direct current stabilizer is in reality a saturable core reactor. This reactor has two windings distributed on the outer legs of a shell type core. When direct current flows through one winding, the a-c impedance of the other winding varies universely with the amount of direct current passing through the first winding. In the schematic diagram, Figure 6, when the load current flowing through coil "D" of the reactor "1" increases, the impedance of coil "A" decreases and permits more alternating current to pass to the dry-disc rectifier "2" to make up for the increased load. If the load current decreases, the impedance of the a-c winding increases in proportion and cuts down the alternating current flow to the rectifier.



North Cabinet type charger. This charger unit is housed in an aluminum finished steel cabinet. It is fastened on a rigid back plate and is arranged for mounting on wall or shelf.

The a-c voltage stabilizer provides a constant voltage input to the rectifier over a range of 95 to 130 volts. This stabilizer is composed of a reactor, a saturable core transformer, and a condenser. The saturable core transformer operates at a high magnetic density and is partially resonated by means of the condenser. The description of the voltage relationships existing in the various parts of the stabilizer is extremely complicated, but the net result is a constant voltage output across the transformer secondary regardless of wide variations of the line voltage across the input terminals. Figure 7 and 8 graphically show the stabilizing effect obtained.

Figures 9 and 10 illustrate the open and closed views of one of the Raytheon Company's automatic battery chargers.

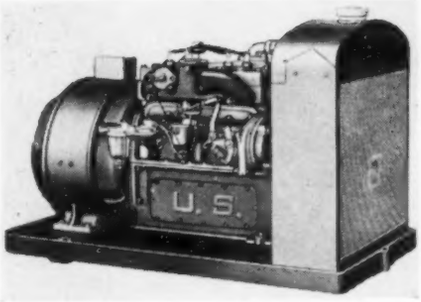


E-P Diverter Pole motor generator battery charger is completely automatic; controls voltage well within high-low limits at all times.

Voltage Control in North Self-Regulating Charger

THE NORTH self-regulating charger makes use of magnetic means in a manner somewhat similar to the direct current saturable core reactor just discussed. This charger consists of a power transformer, voltage control reactor and shunt, selenium rectifier stack, and output choke as the main elements.

The charger operates as follows: When the battery is fully charged, its voltage is at the maximum point desired, and the charging current is very small, just sufficient to supply battery losses. An increase in the load causes the battery voltage to drop from its maximum value and if the load increase is such as to cause the drop to reach a certain value, the control elements operate to increase the charger output to supply the demand. This critical point occurs at "A" on the curve shown in



DC battery charger of United States Motor Corp., Oshkosh, Wis. Charger is multi-cylinder, water cooled, available in size and voltage to meet exchange requirements.

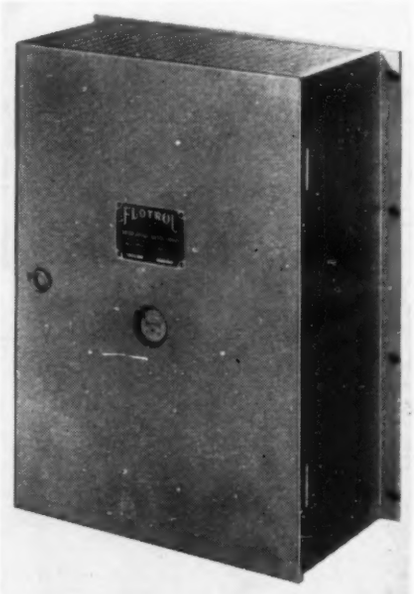
Figure 11 and is termed the "cut in" point.

If now the load decreases, part of the output current is diverted to charging the battery, causing the battery voltage to rise to the "cut out" point "B" on the curve. The control elements the operate to reduce the charger output to its minimum point. When the load again increases, the cycle of operation is repeated.

The North self-regulating charger is illustrated in Figure 12.

Flotrol Automatic Battery Charger

FLOTROL operates without moving parts and is fundamentally different from any other constant voltage battery charger on the market. Basically it consists of an electric phase-splitting transformer and a dry disc rectifier. With these simple elements, the Flotrol compensates for changes in input voltage and changes in load.



Flotrol, automatic battery charger that operates without moving parts, manufactured by Lorain Products, Lorain, Ohio.

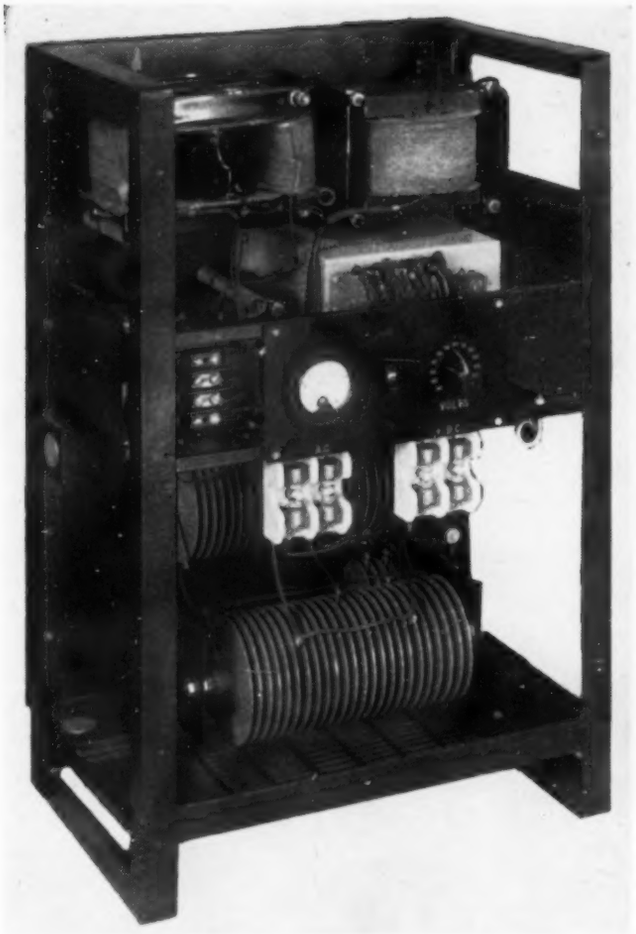


Fig. 13 — Open view of Convotrol automatic battery charger.

Furthermore, it provides overload protection while operating at high power factor and high efficiency.

The dual range Flotrol chargers provide for operation on any one of five different input voltage ranges: 95-115 V., 105-125 V., 190-230 V., 200-240 V., 210-250 V. Thus the most economical operating voltage can be selected for any given locality.

These same models provide for operation with either 11, 12, 22, 23, or 24 cell batteries, so that if 24 volt and 48 volt offices are operated in the same area, the same Flotrol can be adapted, by the user's maintenance men, for operation in either type of office.

Flotrol is entirely automatic—delivers correct trickle charge at all times and does not use motors, marginal relays, time delay devices, biased reactors, D. C. Stabilizers, reference voltage cells, voltage regulator tubes, or other expendable parts.

The Convotrol Method of Automatic Battery Charging

THE CONVOTROL automatic battery charger has a special regulator operating by magnetic means, a permanent magnet being used as the standard of measurement for adjusting the battery voltage within 1 volt of the desired value over a range of 44 to 56 volts. The automatic regulator also compensates for changes in line voltage varying within 10 per cent, variations of the frequency of the input alternating current between 48 and 65 cycles, changes in the battery discharge load from zero to rated capacity, aging of the selenium rectifier unit, temperature variations of the battery, and changes in the ambient temperature.

When used in the continuous float method of charging, this charger carries the entire discharge load up to its rated capacity and keeps the battery fully charged. In case of a heavy battery drain caused by temporary failure of the alternating current supply or by an excessively heavy load, the charger will operate to bring the battery back to normal without overloading itself. This unit is designed to automatically limit its output to 120 per cent of its rating, thus preventing damage to the rectifier.

Figures 13 and 14 illustrate the appearance of the Convotrol automatic battery charger.

(Please turn to page 63)

Yes! . . . Send us your problems on Construction and Maintenance . . . and we will endeavor to answer them along with dozens of others that have been submitted to our editorial staff in the big—

SPRING CONSTRUCTION and MAINTENANCE issue of

TELEPHONE ENGINEER and MANAGEMENT

April 15, 1947

This annual feature number will be jam-packed with timely and valuable information on construction, replacements, repairs, new products, new ideas, etc.

Special articles will be profusely illustrated . . . Line and Desk pages will present answers to many stubborn problems sent in by our readers.

All of this . . . plus . . . the usual editorial features that have caused TELEPHONE ENGINEER and MANAGEMENT to have more **paid** subscribers among managers, engineers and maintenance men than any other telephone trade journal.

Manufacturers and suppliers serving construction and maintenance materials will, as usual, feature construction and maintenance items available in their advertisements.

***Watch for the* SPRING CONSTRUCTION and MAINTENANCE**

issue of TELEPHONE ENGINEER and MANAGEMENT---April 15, 1947

Roundtable LINE and DESK Discussions

Edited By
J. S. REED, JR.

Q. What speed would you recommend for the operation of an earth boring machine?

A. The operating speed of an earth borer would depend on soil conditions and should be that recommended by the manufacturer. In general, the auger speed should be about 125 R.P.M. in ordinary soil (loam, clay, or sand) and 25 R.P.M. in shale or sandstone; also in frozen soil.

◆

Q. In setting poles to the depths specified in standard tables, we find that sometimes poles will lean to one side. Why should they do this?

4. Assuming that the condition you describe occurs in straight sections of the line, this may indicate that the soil is quite loose or swampy, or that you have an unusually heavy wire load exposed to cross winds. In such cases, we recommend that you set your poles two feet deeper than specified in your tables, or use ground braces. (If you set your poles deeper, make sure you have the proper overhead clearances.) In very swampy soil, you may have to employ two side guys to swamp anchors and possibly a platform of creosoted timber bolted to each pole to keep it from sinking. Use a lead to height ratio of not less than one, if possible, so that the pole will not be forced down into the soil.

◆

Q. We have had a large number of rural power line extensions in our area. Because of the greatly increased hazard of power crosses with our own lines, we wish to protect our men from dangerous shocks. What preventative measures can we use?

A. The use of dependable protective equipment affords some protection in cases of power crosses. It is dangerous, however, to handle wires or protective equipment in such cases. Look for indications of arcing at main frames, protected terminals, and sub-station protectors. In a few instances the protector blocks may be only partially shorted and may produce only a faint hissing sound with an almost imperceptible spark. Yet, if an attempt were made to remove the blocks, severe shock or burn may result. The safest course to follow is not to touch wires or protective equipment in all cases where sparks, noise, odor, or smoke are noticed, until it is definitely known that the high voltage cross has been removed. Be constantly on the alert for signs of excessive voltages on your lines, especially after storms.

◆

Q. In computing storm stress on an open-wire lead, why should the equivalent wire load be used, rather than the actual wire load, when ten or more wires are involved?

A. In heavy and medium loading areas, when ice accumulates on the line wires, the ice covered wires on the windward side of the lead shield the wires on the lee side, so that the transverse wind force on these wires is less than on those on the windward side. The shielding effect is such as to result in only two-thirds of the total number of wires in being effective in producing a turning force on the poles. In light loading areas, ice does not accumulate on the wires and no shielding effect is experienced; hence the calculation of the turning force must take into account the actual number of wires in the lead.

◆

Q. Can ordinary pole brackets be used at dead-end points in long-span construction utilizing high strength steel line wire?

A. On account of the heavy stress at dead-end points, it is advisable to use clevis and strain insulator with eye bolt through the pole. If preferred, iron brackets with through bolts may be employed. This ordinarily requires high quality glass insulators, as ordinary insulators may not take the dead-end stress well.

◆

Q. Of what value is a cable record in locating trouble in cable?

A. When trouble occurs in a number of cable pairs at one time, as in wet cable, the cable pairs corresponding to the telephone numbers of subscribers reporting trouble are checked against the cable record. This quickly locates the particular cable in which the defective pairs lie, and the proximity of these pairs to a certain terminal enables the cable crew to immediately start hunting for the trouble with inductive tone equipment, without waiting for Wheatstone bridge tests to be made.

◆

Q. What advantages do you see in the use of drop wire clamps on drop wire?

A. Drop wire clamps save considerable time in the installation of drop wire, being much easier to place than drop wire ties. Furthermore, there is less chance of wear and tear on the drop wire due to wind sway, as the clamp swings on its support instead of the wire. Of course, the wire should not be pulled up too tight, as this would place additional strain on the wire insulation at the clamps.

Free Help on Problems

IF YOU DON'T see a ready answer to your questions, let TELEPHONE ENGINEER'S staff of technical men tackle it for you. This is a free service. Your question and the resulting answer may not only solve your problem but help the many other telephone men reading these columns. Jot your questions on a postcard and look to LINE and DESK for reply.

THIS striking head-dress is a recent example of the painstaking research which guides Bell Telephone Laboratories' scientists in designing new or improved equipment for the Bell System.

Created by Bell Laboratories, it measured accurately the head contours of many, many operators. With the knowledge it provided, the scientists designed a radically different operator's headset that is at once the most comfortable and the most efficient yet developed.

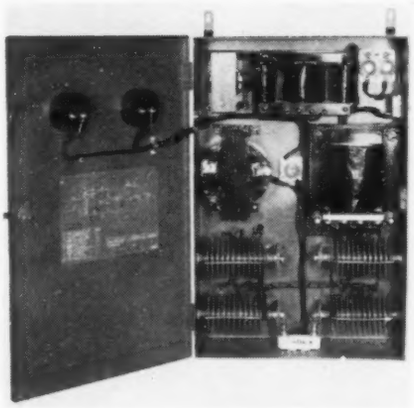
Not only at Bell Laboratories, but also at Western Electric —where Bell System equipment is manufactured—even the smallest detail is considered much too important to let any guesswork creep in!

Most comfortable headset because improved transmitter, receiver and headband weigh less than 6 ounces. Neckstrap and horn are eliminated.

Most efficient headset because—for the first time—the mouthpiece moves with the operator's head, is always directly in front of her mouth.

Western Electric

TELEPHONE APPARATUS AND CABLE



Schauer Electrox constant volt battery charger delivers smooth, humless, constant output voltage irrespective of current drain, up to the maximum output of the rectifier. Standard rectifier capacities of 1 to 4 amps., from 12 to 48 volts.

Conclusion

ONE FEATURE not mentioned in the discussion of automatic battery chargers is the provision of a switch to convert the charger to manual operation so that an equalizing charge can be given the battery should this be necessary at any time. An equalizing, or freshening, charge is occasionally required in order to bring low cells up to normal voltage and specific gravity.

Battery manufacturers recommend that automatic regulation of battery charging equipment be provided to assure long battery life. The automatic chargers described in this article most nearly meet this recommendation.

An automatic charger, aside from prolonging battery life and providing a constant voltage output of the battery, makes possible much less attention of the central office battery than when a non-automatic charger is utilized. This is particularly an advantage in the case of non-attended dial offices, where it is possible for the visiting maintenance man to have to add water to the cells only once or twice a year to make up for evaporation. Because of the greatly diminished activity of the battery, no other attention, except for occasional addition of water and infrequent check of the specific gravity to make sure there are no low cells, is required.

THE END

SUB-CYCLE

SAFEGUARDS
YOUR SIGNALING SERVICE

SUB-CYCLE embodies all the desirable characteristics for the ideal Ringing Converter and has proved its value and efficiency over a long period of years and under the severest operating conditions. With SUB-CYCLE there is no routine maintenance for there are no moving parts, or anything to adjust. It operates on A.C. current and is quiet and economical in operation.

PRECISION BUILT FOR HEAVY DUTY.

MADE IN SEVERAL MODELS FOR LOADS FROM SMALL PBX TO LARGE CENTRAL OFFICE

Also
PULSATORS

Sold by Leading Distributors

Use FLOTROL — The Ideal Automatic Constant Voltage Battery Charger With No Moving Parts

THE LORAIN PRODUCTS CORPORATION
LORAIN, OHIO

Management Quickie

(*Concluded from page* 37)

is not wholly a matter of revenue betterment. Poor transmission from switching service telephones causes complaints from all subscribers. The matter becomes betterment of service also. One line satisfactorily converted will often stimulate the conversion of others. It should be made a routine task until all lines possible shall have been converted to company owned rural circuits.

There are other details which each company must develop for itself. One is the amount, if any, that must be paid to the switching service line shareholders for their ownership in the line and the telephones. Quite possibly a uniform contract to cover these points can be worked out but it is essential that **all switching service line shareholders be treated the same way exactly in the same service area.**

Upgrading of other types of service will be discussed in future sections.

NOTE: *Space requirements prescribe condensation of this material. Reader's time economy demands brevity. If you are not clear on any point or take exception to any statement you will confer a favor on the author by writing for consideration of your opinion or further expansion of the text in the interest of clarification. THANKS.*—**JAY G. MITCHELL.**

ASA Elects F. R. Lack To Presidency of Group

Frederick R. Lack, vice president of Western Electric Company will be president of the American Standards Association for the ensuing year, it was recently announced.

Mr. Lack succeeds Henry B. Bryans, executive vice president of the Philadelphia Electric Company. Mr. Lack formerly was vice president of the ASA.

George H. Tabor, Jr. will be vice president of the Association for the coming year. He is executive vice president of the Sinclair Refining Company and already was a member of the Board of Directors of the ASA. W. Averell Harriman, Secretary of Commerce, in a telegram to Mr. Lack hailing his election said: "In the critical years ahead, I envision the ASA federation of some 100 trade, technical, consumer and governmental bodies as making an outstanding contribution to strengthening our national economy".

SINCE 1889
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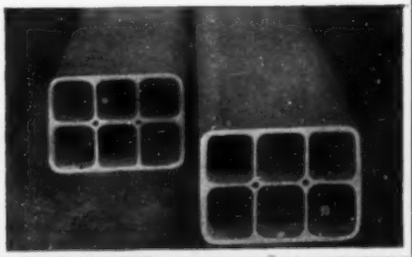
CLAY CONDUIT

The proved and standard Protection for Underground Telephone Cables.

Cheapest in the long run. Highest quality and a full line of shapes.



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Save Time-Reduce Costs

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Kearney Con-nec-tites provide a positive, permanent, solderless, high pressure contact. They give you economical and dependable connections. They are quickly and easily installed. Use them for connecting bridle to arm of open wire, for test points, dead ends, buck arm corners or in test pole connections. Available for all combinations of metallic conductors. Standardize on Kearney Con-nec-tites. For complete information and prices see your jobber — or write

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

JAMES R. KEARNEY CORPORATION Overhead and Underground Utility Equipment
4236 CLAYTON AVE. • ST. LOUIS 10, MO.

The full length treatment protects Penta Poles from top to butt.

Held Orders

(Continued from page 30)

the old subscriber but the industry is agreed that it must provide service fast and improve it afterward.

Many managers have found that progress can be made by cutting the terminals used for testing purposes to the barest minimum. The same trick has been used on numbers for company business. If a block of numbers has been assigned for coin box growth, the present practice is to cut to a minimum and use the released numbers for regular service. Numbers saved for PBX growth can be utilized in the same manner.

Those are but a few examples of how the telephone companies are utilizing central office equipment in an effort to give service to more customers sooner!

Every Cable Pair Must Be Working

THE business of giving the public what it wants, when it wants it has even touched the outside plant.

Submarine cable is being placed underground; buried cable is strung aerially. Need a 26-pair cable? String two 11-pair cables together!

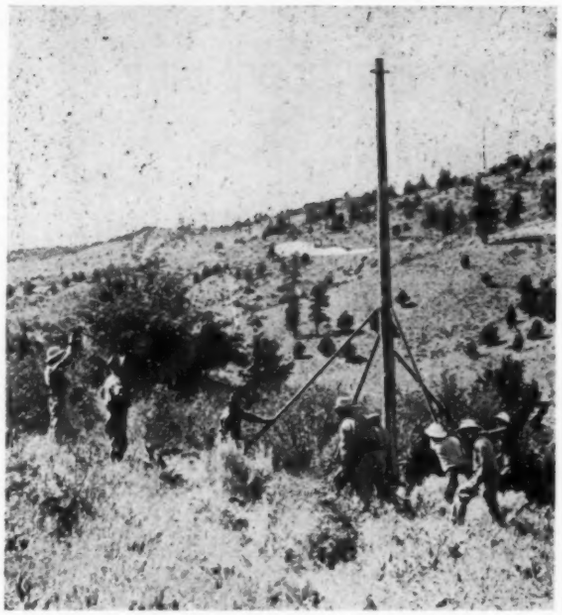
Unorthodox? Yes. But such departures from established methods are helping a great industry get even with the board. Probably—"not in accord with some 'long distance' prove in rules, but to serve the public as fast as it can with the means at hand."

Back before the demand got ahead of the facilities, it was more economical to maintain service by merely transferring to a good pair when one went bad. Today working pairs in existing cables are needed and every effort is made to keep pairs working.

And cable plant activity is not alone. Instruments and protectors are being recovered when telephones are disconnected. In some cases home made connector blocks and ground rods were installed to overcome temporary shortages as a temporary practice. Worn and frayed telephone cords are being taped; this leaves the new cords to equip new telephone sets.

Skeleton Boards

THE HEAVY flow of telephone traffic which overtaxes facilities



Pike poles were used in building the Jackrabbit alternate telephone route on the west coast to raise poles in mountain country when trucks and tractors could not make the steep grades.

of regular switchboards has, and still does present a problem in student operator training. Some companies, confronted by the job of training operators and boards with all positions filled, have relieved the situation and trained students in as near actual conditions as possible by constructing skeleton training boards.

These boards are not fully equipped, but have a sufficient number of jacks and relays wired to enable the instructress to simulate most every type of customer call. There have been several types of skeleton boards utilized during the present emergency.

Usually the board is composed of three positions—two for student operators and one for the control operator. A baffle board is used to shield the instructress' voice from the student operators. From the control position various types of calls and most operations can be simulated.

The instructress can place customer calls, ringing signals, busies, and customer answers. Students are stationed at these boards, given instructions on the proper handling of calls and then intensive practice.

One company recently completed training of 45 students in a full two-week course in proper operating practices on a skeleton board similar to the one described above.

While the training units are in the majority designed for manual instruction, they may be designed so that they can be modified and used for automatic training.

Help Shortage

IT TAKES employees—good—well trained employees—to run a business that serves the public as the telephone industry does. The job of meeting service demands has forced companies to build up their forces; and even in this phase of the business—breaking in new employees—the industry has demonstrated its ability to do a good job fast.

New employees have been teamed with the experienced workers and sent out to "do the job while learning." Personnel managers have scanned the records, located old installers and temporarily transferred them to their old jobs.

Many companies have speeded up installations by allowing new installers to pre-wire subscribers' premises in advance of the actual installation. One company trained high school boys in installation procedures and allowed them to pre-wire subscribers' premises.

An Industry Whips Its Biggest Problem

LACK of space prohibits review of all the methods used by the entire telephone industry in its drive to provide service to waiting customers.

One company looks over the shoulder of another at work in progress, ideas are exchanged and the industry as a whole realizes the job ahead is large. There is always a day-to-day task of improving telephone service and providing service to all who want it, and the companies of today are using every expedient to get the job done. The incidents of recourse and ingenuity recorded in this article clearly prove—the telephone industry has always "given the public the service it wanted when it wanted it" and it is determined to continue that record.

THE END

ALL the strength and durability inherent in steel are combined---with definite economies---in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

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This powerful pruner cuts closer, is stronger than any other similar tool on the market. Can be operated in close tangled growth; cutting easily and cleanly branches up to 1½" in diameter. No trouble with spring breakage.
Here is the only pruner with the famous Seymour Smith "Center Cut" construction; safety catch to lock blade closed; one piece tempered tool steel blade; reinforced hook; extra long life spring; ball bearing pulley; highest quality chain; unbreakable iron head.
Designed by experts for experts; demanded by public utility companies everywhere, it will pay you to write for literature and prices.
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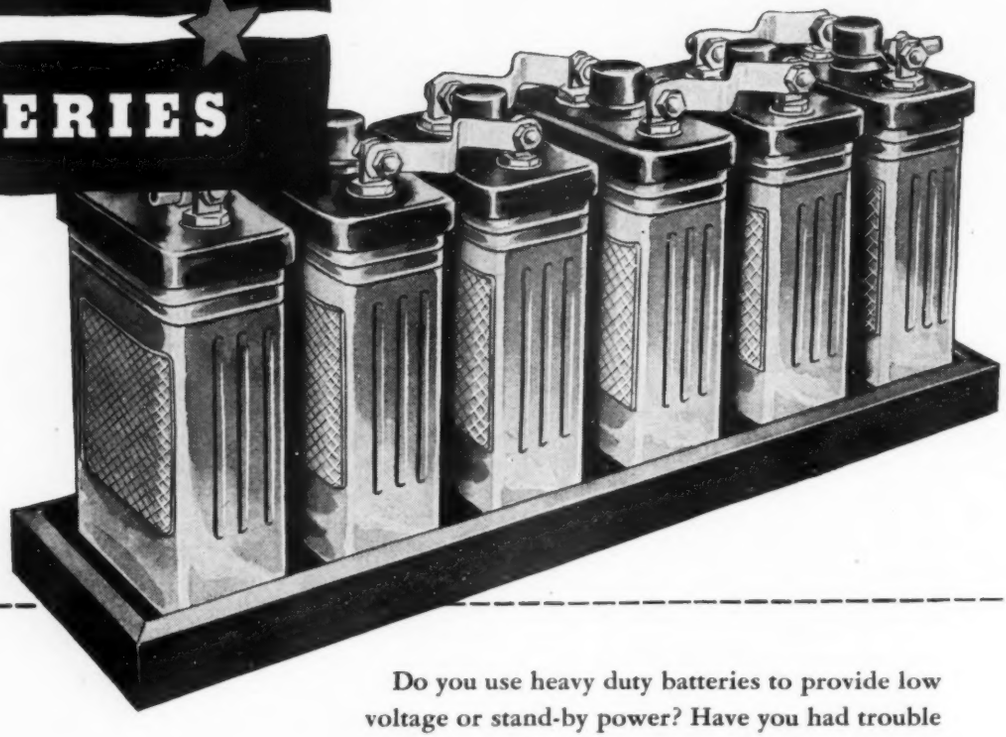
INDUSTRIAL STORAGE BATTERIES

MULTIPLE CELL HEAVY DUTY EQUIPMENT UNUSED SURPLUS IMMEDIATELY AVAILABLE



Do you use heavy duty batteries to provide low voltage or stand-by power? Have you had trouble obtaining standard replacement or new equipment made by well-known firms?

You can get the equipment you want immediately at the Philadelphia, Chicago, Denver, Cincinnati and Richmond offices of WAA. In most instances, priority claimants have already had an opportunity to purchase and you will not have to wait for delivery. The batteries are unused, many in original packing and complete with trays. Make sure you have an opportunity to purchase. Write, wire, phone, or visit the indicated offices at once.

This equipment may not be exported because of continued U. S. Lead shortages.

USED BATTERIES ALSO AVAILABLE

Heavy-duty used batteries will be offered for competitive bid sale. To receive bid offerings write the indicated offices and ask to be placed on the used Battery mailing lists.

OFFICE OF GENERAL DISPOSAL

WAR ASSETS ADMINISTRATION

GOVERNMENT WAA SURPLUS

Offices located at: ATLANTA • BIRMINGHAM • BOSTON • CHARLOTTE • CHICAGO • CINCINNATI CLEVELAND • DALLAS • DENVER • DETROIT • FORT WORTH • HELENA • HOUSTON • JACKSONVILLE KANSAS CITY, MO. • LITTLE ROCK • LOS ANGELES • LOUISVILLE • MINNEAPOLIS • NASHVILLE NEW ORLEANS • NEW YORK • OMAHA • PHILADELPHIA • PORTLAND, ORE. • RICHMOND ST. LOUIS • SALT LAKE CITY • SAN ANTONIO • SAN FRANCISCO • SEATTLE • SPOKANE • TULSA

1037-A

POLE GUYING (Continued)

Table No. 8—Guy Strand Sizes Recommended for Pole Corners with Pull of 50 Feet or More in Lines Carrying 8 to 20 wires or Pull of 35 Feet or More in Lines Carrying over 20 Wires.

No. of Wires	L/H Ratio													
	0.2	0.25	0.3	0.35	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	2.0	Guy to Pole Stub
8 to 10	10M	10M	6M	6M	6M	6M	6M	6M	6M	6M	2.2M	2.2M	2.2M	2.2M
12 to 20	20M	16M	16M	16M	10M	10M	10M	6M	6M	6M	6M	6M	6M	6M
22 to 30	26M	22M	20M	16M	16M	16M	10M	10M	10M	10M	10M	6M	6M	6M
32 to 40	36M	30M	26M	22M	20M	16M	16M	16M	16M	10M	10M	10M	10M	10M
42 to 50	48M	36M	30M	26M	26M	20M	16M	16M	16M	16M	16M	10M	10M	10M

POLES at railroad crossings shall be guyed in accordance with the National Electrical Safety Code (Safety Rules for the Installation and Maintenance of Electrical Supply and Communication Lines—Handbook H32 of the Bureau of Standards), except where supplanted by specific state regulations.

These rules require that head and side guys (or side braces) shall be used on poles supporting the crossing span, unless the poles meet specified strength requirements. Head guys are not required when cable supported on 6,000-pound or heavier messenger crosses over a railroad. If the crossing line changes direction more than 10 degrees (approximately 8-foot pull) at either crossing pole, the side guy within the angle may be replaced by a head guy placed in the direction of the adjacent span unless the angle at the turn is greater than 60 degrees (50-foot pull). In the case of lines crossing over a spur or stub tracks, guying is not required if the pole is not stressed beyond one-third of its ultimate stress (for side guying) and if no unbalanced pull exists, such as that due to dead ending part of the wires or to a small angle in the line at one of the crossing poles.

Side guys used in a straight section of the line crossing the tracks are considered to take the entire load in a direction at right angles to the line. Head guys are installed in the direction away from the crossing and shall be of the size specified in Table Nos. 9 and 10 as required by the National Electrical Safety Code.

Table No. 9—Strength of Head Guys in Pounds Required for Poles at Railroad Crossings in Heavy Loading District.

Number of Wires	Ratio of Guy Lead to Height Not Less Than: 1.25	1	0.75	0.67	0.5
2	4,000	4,000	4,000	4,000	4,000
4 to 6	4,000	4,000	4,000	4,000	6,000
8 to 10	6,000	6,000	6,000	10,000	10,000
12 to 20	10,000	10,000	12,000	16,000	16,000
22 to 30	16,000	16,000	20,000	20,000	26,000
32 to 40	20,000	20,000	26,000	26,000	32,000
42 to 50	20,000	20,000	30,000	32,000	42,000
52 to 60	26,000	30,000	36,000	36,000	48,000
62 to 70	30,000	30,000	40,000	48,000	60,000
72 to 80	36,000	40,000	48,000	60,000	70,000

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Service

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COLUMBUS 8, OHIO

MAIN 6533

A Nationally & Internationally known Organization

Employee Relations

(*Continued from page* 32)

the trouble to save him from paying too much tax.

Recreational Program

COMPANY sponsored reading and recreational programs are an immediate aim, now that all employees are on a 40-hour week, and have more time for recreation. We are all looking forward to the time when our new telephone building in Harrisonburg will become a reality. When that time comes we hope to innaugurate a self improvement program for all employees who wish to participate.

Employees in all departments are given 15-minute rest periods in the mornings and afternoons. The employers insist that these rest periods be taken so that the routine of the day may be broken, and the employee can return to his job refreshed.

As the company grows the employee is made to feel that he is in part responsible for that growth and that he will share in it.

There are many intangible ways in which the management of our company has proved over and over again its willingness to go out of the way to make the employee happier and more content in his job, and show him that in his employers estimation he is an important individual.

There are, however, always a few individuals who are problems, and who cannot adjust to working with a group. They are given every opportunity to improve—conferences are held with them and the necessity for improvement and ways whereby they may, are pointed out. Only when they fail to respond do we resort to dismissal. Every Harrisonburg Telephone Company employee knows that the management of his company will cooperate with him in every way in his job, and that if he shows initiative, ability, and willingness to cooperate with management, he will be given an opportunity for advancement. Progressive wage schedules are in effect in every department, and when a person is employed he knows he has a definite future as far as promotions and pay scales are concerned.

On this, your ———— Anniversary as an employee of the Harrisonburg Telephone Company, we send you Greetings!

We want you to know we are happy to have you a part of our organization. We appreciate your faithfulness, your loyalty, your devotion to duty, not only to your Company, but to all of our customers as well.

We hope you have been happy with us, and that you will always know that your best interests, and those of the people we serve, are ever foremost in our minds.

Sincerely,

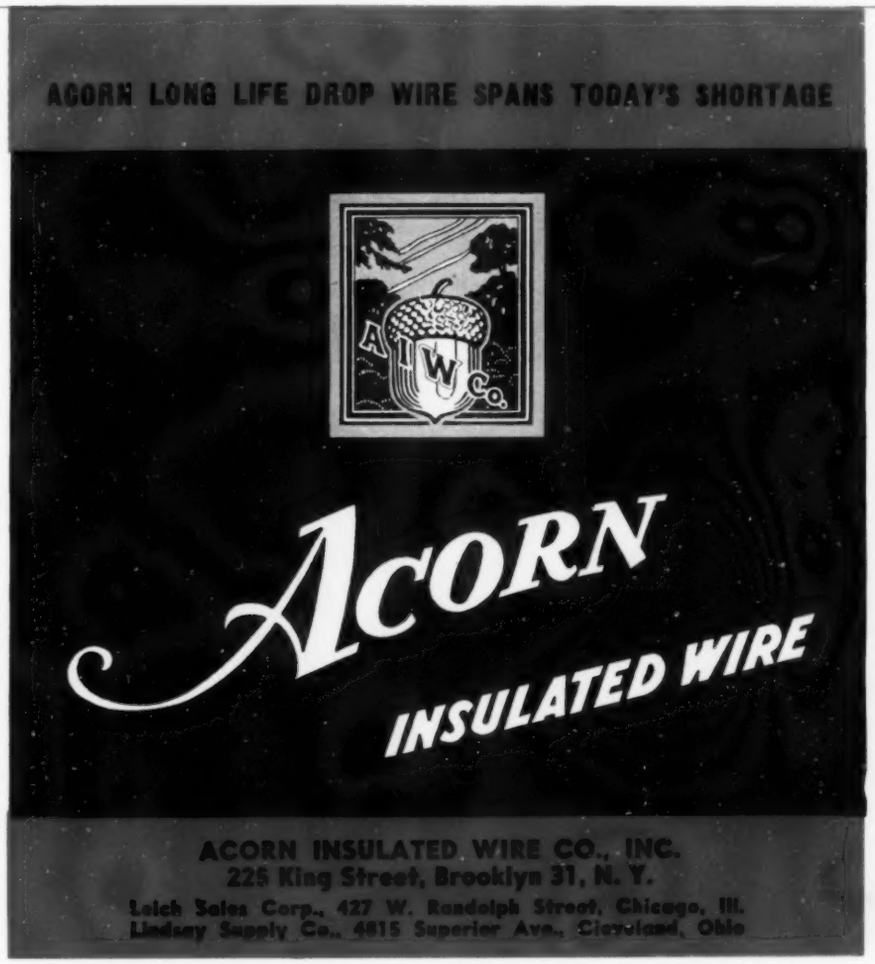
President

Service anniversaries are remembered by management of Harrisonburg Telephone Company with cards similar to the one above.

Conclusion

OF COURSE, I realize that our company is neither as large nor as small as some of the other Independent companies. Larger companies, no doubt, have full time personnel directors who can work out effective programs. But the thing we like particularly about our company is that *personnel problems are worked out on a cooperative basis—the President and General Manager taking as much interest in the personal welfare of each employee as do the heads of departments and other officers.* And we are satisfied that the "*second Mile*" the management of our company has gone, has not been in vain—*for the dividends paid in jobs well done, the loyalty and esteem manifested by the employees, have made it well worthwhile.*

THE END.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As these advertisements point out, the shortest, easiest route to products and services is through the pages of the Classified Telephone Directory. • Currently appearing in national magazines this series of humorous messages renders an important service to the public—to the benefit of the entire industry.

AN ADVERTISEMENT OF THE BELL TELEPHONE SYSTEM

Need a refrigerator service man?

You'll find HIM
. . . or beauty shops
. . . or plumbers
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and real help on
your household
or business buying
problems . . . if you

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Need a new hair do?

You'll find beauty shops
OR
umbrellas
...or grocers
...or bakers
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just about everything
you might need...
quickly and
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Use the YELLOW PAGES of your Telephone Directory

Need a repair man ?

You'll find tire repairs
or
tailors
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Premax Metal Letters and Figures Withstand Any Storms

Storms that make stenciling illegible have no effect on Premax Metal Markings which will last and be clearly visible as long as the life of the telephone pole they identify. Standard equipment that lowers marking costs and never requires maintenance.

Write for complete details and prices.

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4708 Highland Ave. Niagara Falls, N. Y.

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DROP—BRIDLE—INTERIOR DUCT — FIXTURE — TREE AND GROUND WIRE or RUBBER and PLASTIC

DROP WIRE

TWISTED PAIR and PARALLEL in NEOPRENE

Manufactured to exacting specifications, utilizing advanced techniques and modern equipment under positive laboratory control.

Write us about your needs.

GENERAL INSULATED WIRE WORKS, INC.

PROVIDENCE, RHODE ISLAND

Coming Conventions

Tennessee Independent Telephone Association, Andrew Jackson Hotel, Nashville, Mar. 24.

Kentucky Independent Telephone Association, Brown Hotel, Louisville, March 26.

Illinois Telephone Association, Hotel Pere Marquette, Peoria, April 3 and 4.

Nebraska Telephone Association, Hotel Lincoln, Lincoln, April 8 and 9.

United States Independent Telephone Association Executives' Conference, Edgewater Beach Hotel, Chicago, April 14 and 15.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 22 and 23.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 7 and 8.

Kansas Telephone Association, Jayhawk Hotel, Topeka, May 16 and 17.

New York State Telephone Association, Hotel Onondaga, Syracuse, May 21 and 22.

Wisconsin State Telephone Association, Park Hotel, Madison, May 21 and 22.

Michigan Independent Telephone Association, Olds Hotel, Lansing, September 17 and 18.

United States Independent Telephone Association, Stevens Hotel, Chicago, October 14, 15 and 16.

North Carolina Independent Telephone Association, Hotel Southern Pines, Pine Needles, October 27 and 28.

Virginia Independent Telephone Association, Hotel Roanoke, Roanoke, October 30 and 31.

Missouri Telephone Association, Governor Hotel, Jefferson City, November 17 and 18.

Electric Products Company Names Udylite Corp. Distributor

Gordon J. Berry, vice president of The Electric Products Company, Cleveland, Ohio, has announced that effective December 1, 1946, The Udylite Corporation of Detroit was appointed a distributor of E. P. electrolytic motor generators.

Udylite, with its nation-wide organization of sales representatives throughout the industrial centers of the country is in constant contact with all elements of the plating and finishing industry.

◆

Kellogg Describes Masterphone In New "X-Ray" Booklet

Kellogg Switchboard & Supply Company recently issued a new 24-page booklet in color "An X-Ray Story of the Kellogg Masterphones". The outstanding feature of the booklet is its unique method of analyzing and sectioning the construction of the company's new 1000 series desk Masterphone with the Kellogg Master-Dial by means of a series of four transparent overlay "windows".

This new visual design enables the reader, simply by turning the pages of the book, literally to take a telephone apart. In this way many interesting details of the Kellogg desk-set telephone can be studied—its ringer design, condenser and induction coil, one-piece interconnecting block, and base plate. The Kellogg telephone's many design refinements and operating features can be more clearly seen and understood than ever before by means of this new book.

Concisely and progressively, this unusual book disassembles the Masterphone and at the same time shows why installing and servicing this instrument is so easy and simple. It also shows how this new telephone is so quickly adaptable to all types of subscriber services, where all of its accessible components are mounted and what its many improvements mean in lower installation and maintenance costs.

Free copies of "An X-Ray Story of the Kellogg Masterphones" are available by writing Kellogg Switchboard & Supply Company, 6650 South Cicero Ave., Chicago 38, Illinois.

Turner Brass Works Introduce New Fire Pot

Introduction of a new low-pressure fire pot with "carburetor control" is being announced by the Turner Brass Works, Sycamore, Illinois, manufacturers of the popular line of Turner Tested Torches.

This new fire pot features an exclusive, adjustable syphoning tube which enables the pot to operate at a pressure of only 20 to 30 pounds as compared with 40 to 60 pounds for old style models. The syphoning tube is mounted so that it can

New low-pressure fire pot with "carburetor control" announced by Turner Brass Works.

be moved back and forth in the burner, thus permitting instant balancing of the gas and air mixture to meet widely varying fuel and job conditions. It was emphasized that this method affords more perfect combustion, and a more intense flame is thus concentrated at the proper point. This feature alone means longer coil life because the flame is not distributed over the entire coil to form destructive carbonization.

In addition to "carburetor control", many other outstanding features are incorporated in this new fire pot. The flame control valve, which adjusts the flame to any desired heat, has a stainless steel orifice cleaner which automatically cleans the orifice; thereby eliminating the need for a separate cleaner wire.

This Turner No. 275 fire pot will melt 20 pounds of lead in 3 minutes, has a fuel capacity of 9 pints, and takes a 6" melting pot. Shipping weight of the entire unit is listed at 14 pounds.

FROM THE COMPLETE LINE OF OLIVER POLE LINE MATERIALS

OLIVER TELEPHONE LINE PINS

The Oliver pins illustrated are made for use with standard insulators having 1-inch diameter pin hole. They are forged from high carbon open hearth steel, and hot dip galvanized. Wood cobs are of air-dried oak, boiled in paraffine.

Makers of Pole Line Materials Since 1894

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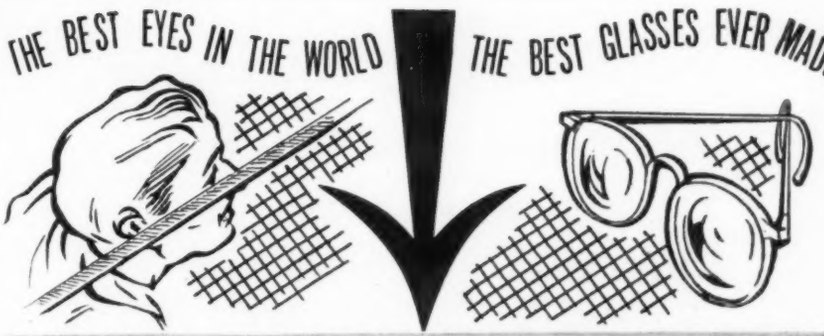
THE BEST EYES IN THE WORLD THE BEST GLASSES EVER MADE



. . . are not good enough to detect tension and sag to TODAY'S standards!

Be CERTAIN with a Dillon DYNAMOMETER

Quickly gives you exact readings. Takes out all guessing. SAVES TIME. Saves maintenance. Up-to-the-minute telephone men are using Dillon Dynamometers for guys, conductor, strand or high tension wire. Large easily read figures in pounds, instantly read. No charts. No figuring. Compact, easily carried. Nine capacities for 500 to 20,000 lbs., all same size.

Weight: 8 lbs., 4 oz. Size 8¼" x 6¼" x 3". Not injured by overload. Strong construction cased for all weathers

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MORRIS E. LEEDS, (left), president emeritis and founder of Leeds & Northrup, with CHARLES S. REDDING, president.

Pennsylvania University Honors Head of Leeds

Charles S. Redding, president of Leeds & Northrup Company, manufacturers of electrical measuring instruments and heat treating furnaces, received the honorary degree of Doctor of Science at the mid-winter commencement exercises of the University of Pennsylvania February 15. The degree was presented by Dr. George William McClelland, president of the university, from which Mr. Redding was graduated in 1906 and subsequently served for two years as a member of the faculty. He is an associate trustee of the university. He succeeded Morris E. Leeds, now chairman of the board, as president.

◆

Kent Elected To Finch Board of Directors

Captain W. G. H. Finch, president of Finch Telecommunications, Inc., Passaic, New Jersey, manufacturer of radio and wire facsimile apparatus and other electronic equipment, has announced that Herbert A. Kent, president of P. Lorillard & Company, was elected a director of Finch Telecommunications, Inc., at its annual meeting of stockholders. Other directors re-elected at the stockholders' meeting were W. G. H. Finch, Raymond B. Littlefield, Herbert L. Pettey, Frank H. Bottenus and Frank R. Brick, Jr.

◆

Index Available For Philips Technical Review

A 20-page index listing all articles which have appeared in Philips Technical Review during the period January 1936 (first issue) to June 1942 (last issue prior to suspension of publication during German Occupation of Holland) is available on request from Elsevier Book Company, Inc., 215 Fourth Avenue, New York 3, N. Y.

The index, distributed free as a service to readers, alphabetically catalogues by subject all articles which appeared during that period.

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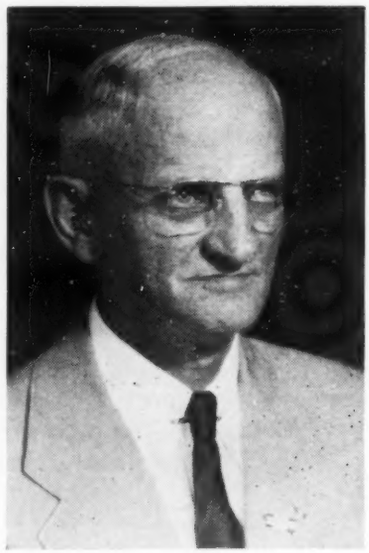
Melvin J. Arndt Dies

Death called the second Stromberg-Carlson telephone veteran to pass within a month when Melvin J. Arndt, 65, former chief telephone draftsman, died at his Rochester home here January 30 after a short illness. He had been employed by Stromberg-Carlson more than 41 years. Charles H. Bergman, another 41 year veteran, died December 31.

Mr. Arndt was born and educated in Amherst, Ohio. After his high school days he took a correspondence course in telephone engineering and followed it with night courses in Elyria Business College.



MELVIN J. ARNDT

His telephone experience began with the Dean Electric Company of Elyria in 1905. Later this concern was purchased by the Garford Manufacturing Company which in turn sold out its telephonic interests to Stromberg-Carlson in 1916, at which time Mr. Arndt and his family moved to Rochester.

He served four years in the Ohio National Guard, 5th Infantry, and retired with a first Lieutenant's commission.

He had at different times been employed in the Stromberg-Carlson cable department, switchboard wiring and testing department, engineering division, installation department, and telephone product design laboratory. He was in charge of the drafting department from 1923 till 1944 when he was advanced to assist in the development of the Stromberg-Carlson relay-dial systems.

Besides his widow, he is survived by a son, Willis W. Arndt of the Stromberg-Carlson engineering division, and a daughter, Mrs. Vernon Clark of Penfield, New York.

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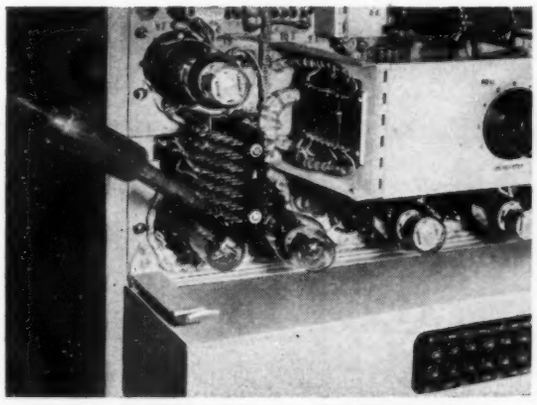
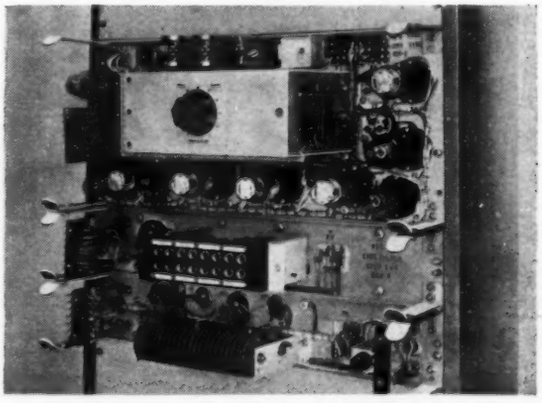


TERMINAL PANEL FLEXIBILITY



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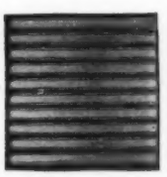

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American Coach & Body Announces Sales Appointment

C. G. Wood, director of sales for The American Coach & Body Co., Cleveland, Ohio, has announced the following sales appointments: Deming Bronson, sales manager, Central Division; Homer A. Feyen, sales manager, Midwestern Division; William R. Hall, sales manager, Eastern Division.

Deming Bronson comes to The American Coach & Body Co. with diversified selling experience. Most recently he served as a consultant for The National Tube Company, Pittsburgh, Pa. Many of his business years were in the service of General Paint Corporation, a division of Hill, Hubbell & Company. After joining the company, he was put in charge of the San Francisco office as District Manager, transferring to Chicago in 1930. In 1936, he was made a vice president and given complete charge of sales and operations of the Pipe Wrapping Division with headquarters in Cleveland. Other companies with which Mr. Bronson has been associated include: Day Lumber Co., Johns-Manville, Inc.; Parker-Holliday Co.; and Activisible Corp. He will make his headquarters in Cleveland, Ohio.

DEMING BRONSON

Homer A. Feyen joined The American Coach & Body Company in 1946 as sales engineer, after serving four years in the Tank Automotive Division of U. S. Army Ordnance. Feyen has had diversified experience in the automobile business, both in sales and service work. In addition to automotive work, Mr. Feyen has been active in the field of heating equipment, including several years' service as an engineer and branch manager. He will make his headquarters in Des Moines, Iowa.

WILLIAM R. HALL

HOMER A. FEYEN

William R. Hall has been active in several branches of the motor vehicle business. During the war, Hall was a senior Industrial specialist on the War Production Board, and came to The American Coach & Body Company in 1945. Previously, he had been associated with The Federal Motor Truck Co., Newark, N. J., and The Mack & Larrabee Truck Agency of Newburgh, N. Y. For several years he was Director of the Automative Bureau of The Borden Company, with headquarters in New York City. At one time, he was in the transportation consulting business, and just prior to the war, managed a truck leasing and sales service company in New York. He will make his headquarters in New York City.

Index to Advertisers

Acorn Insulated Wire Co. 69
American Coach & Body Co. .....—
American Condenser Co. 79
American Creosote Co. .....—
American Creosoting Co. .....—
American Cross-Arm, Inc. .....—
American Steel & Wire Co. 54
American Tel. & Tel. Co. 70, 71
Anaconda Wire & Cable Co. .....—
Armstrong Cork Co., Whitall Tatum Glass Insulator Dept. 14, 49
Automatic Electric Co. 42, 43
Automatic Electric Sales Corp. 24
Automatic Telephone & Elec. Co., Ltd. 8

Barco Manufacturing Co. .....—
Barnstead Still & Sterilizer Co. ....—
Bartlett Mfg. Co. .....—
Bashlin Co., W. M. 79
Berry & Co., L. M. 78
Bethlehem Steel Corp. .....—
Biddle Co., James G. 51
Blackburn Specialty Co. .....—
Brach Mfg. Co., L. S. 53
Brown Wood Preserving Co. .....—
Buckeye Telephone & Supply Co. 51, 79
Buckingham Mfg. Co., W. H. 16

Cable Spinning Equipment Co. .....—
Calculagraph Co. 9
Carpenter Mfg. Co. .....—
Chance Co., A. B. 53
Chapman Chemical Co. 82
Churchill Cabinet Co. .....—
Clayton & Lambert Mfg. Co. 51
Coffing Hoist Co. .....—
Collyer Insulated Wire Co., Inc. ....—
Commercial Cord & Supply Co. ....—
Connecticut Tel. & Elec. Div. .....—
Cook Electric Co. 15, 49
Cope, T. J., Inc. .....—
Copperweld Steel Co. 14, 75
Cummings Machine Works.....78

Defiance Alloyed Products Co., The..—
Dicke Tool Co. .....—
Dillon & Co., Inc., W. C. 57, 73
Dow Chemical Co., The 10
Drake Electric Works, Inc. .....—
du Pont de Nemours, E. I. Co., Inc. 4
D-X Products Co. .....—

Ederer, Inc., ...—
Eicor, Inc. .....—
Electric Products Co., The .....—
Electric Storage Battery Co. 3
Estwing Mfg. Co. .....—

Fansteel Metallurgical Co. .....—
Federal Tel. & Radio Corp. 77
Forged Steel Products Co. .....—
Four Wheel Drive Co., Inc. .....—

G & W Electric Specialty Co. .....—
Gary Services & Investment Co. ....—
General Cable Corp. .....—
General Electric Co. .....—
General Insulated Wire Works, Inc. 65
General Telephone Directory Co. ... 2
General Telephone & Elec. Co. ....—
Genwilmar, Inc. .....—
Graybar Electric Co. 47
Great American Industries .....—

Habirshaw Cable & Wire Co. .....—
Hallicrafters Co., The .....—
Hammond Drierite Co., W. A. .....—
Hatheway Patterson Co. .....—
Highway Trailer Co. 7
Hirsch Organization, Gustav 68
Holtzer-Cabot Electric Co. .....—
Homelite Corp. .....—
Hubbard & Co. .....—
Hykon Mfg. Co. .....—

Independent Telephone Repair Co. ..—
Indiana Steel & Wire Co. 15, 48, 65
Industrial Instruments, Inc. .....—
International Automatic Electric Corp. 22
International Harvester Co. .....—

Jaques Power Saw Co. .....—
Joslyn Mfg. & Supply Co. .....—

Ka-Mo Tools, Inc. .....—
Kaufman Co., H. J. 78
Kearney Corp., Jas. R. 64
Kellog Switchboard & Supply Co. 12, 13, 14, 15
Kester Solder Co. .....—
Kennecott Wire & Cable Co. 56
Klein & Sons, Mathias 76
Kwikheat Soldering Irons 58

Leeds & Northrup Co. .....—
Leich Sales Corp. 38, 39
Lenz Electric Mfg. Co. .....—
Loomis Advertising Co. 52
Lorain Products Corp. 63

MacGillis & Gibbs Co., The 79
Marmon-Herrington Co., Inc. .....—
Meredith Co., Inc., Wm. C. .....—
Miller Mill Co., T. R. .....—
Mitchell, Jay G. 79
Moss Tie Co. T .J. .....—
Murdock, Wm. J. .....—

National Carbon Co. .....—
National Electric Prod. Co. .....—
National Fireproofing Co. 63
National Telephone Supply Co. 17
Neale Construction Corp. .....—
Newman Mfg. & Sales Co., Inc. .....—
North Electric Mfg. Co. 84
Northwestern Clock Co. .....—

Oliver Iron & Steel Corp. 73
Owens-Illinois Glass Co. .....—

Page & Hill Co. 64
Paragon Electric Co. .....—
Phelps Dodge .....—
Philco Corp. 15
Plastic Wire & Cable Corp. .....—
Porcelain Products, Inc. .....—
Premax Products 72
Ray-O-Vac Co. .....—
Raytheon Mfg. Co. .....—
Rebuilt Electric Equipment Co. ....—
Reliable Electric Co. 23
Remler Co., Ltd. .....—
Rhodes, M. M. & Co. 15
Roebling's Sons Co., John A. .....—
Roll-A-Reel 57
Runzel Cord & Wire Co. .....—

Schauer Machine Co., The .....—
Seymour Smith & Sons, Inc. 72
Sherron Metallic Corp. 83
Sloan, Cook & Lowe 79
Sound Equipment Corp. .....—
Standard Electric Co. 80
Star Expansion Bolt Co. .....—
Stromberg-Carlson Co. 20, 21, 48, 49, 56, 57
Sturgis Posture Chair Co. 49, 57
Suttle Equipment Co. 58
Specialty Device Co. .....—
Sylvania Electric Products, Inc. ....—
Syntron Company .....—

Taylor-Colquitt Co. .....—
Telephone Advertising Inst. ..... —
Telefon Fabric Automatic a/s 51
Telephone Answering & Recording Corp. .....—
Telephone Engineer Pub. Corp. 60, 74
Telephone Repair & Supply Co. 7
Telephone Sales & Service Co. ....—
Telkor, Inc. .....—
Templeton, Kenly & Co. 81
Texas Creosoting Co. .....—
Tinnerman Products, Inc. .....—
Toeppen, Manfred K. 79
Turner Brass Works 54

Union Carbide & Carbon Co. .....—
Union Supply & Electric Co. .....—
Unique Mfg. Co. 74
U. S. Motors Corp. .....—
U. S. Rubber Co. 68
U. S. Steel Corp. 54
Utilities Service Co. .....—

Vulcan Electric Co. 15

War Assets Corp. 66
Ward Leonard Elec. Co. .....—
Western Electric Co. 62
Whitney Blake Co. 55
Wilcox Electric Co. .....—
Williams, Geo. E. 79
Wray & Co., J. G. 79

York-Hoover Corp. 18

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Protection for POLES AND CROSS-ARMS — old or new

Chapman "Penta" Preservative is rapidly winning acceptance as the preferred material for pressure-treatment of wood which is to be exposed to moisture and insects. Tests prove its superior qualities. Linemen and other workers like it because the poles are clean—not sticky.

But "Penta" Preservative has another virtue—not common to conventional preservatives. "Penta" Preservative can be sprayed or painted on poles or cross-arms already installed, or treated by soaking if pressure equipment isn't available. Pressure treatment, of course, provides more thorough and lasting protection, but where that is impossible you can still guard against rot and insects with "Penta" Preservative.

We'll be glad to supply details and facts about Chapman "Penta" Preservative for protecting old or new poles and other timber. Write us today.

CHAPMAN

CHAPMAN CHEMICAL COMPANY
Suite 540
333 North Michigan Ave., Chicago 1, Ill.

"Penta" Preservative contains *Pentachlorphenol*, a product of *The Dow Chemical Company.*

THE BACK OF THE BOOK

By JOHN G. REYNOLDS
Managing Editor

TOP MAN

AT THE top of every telephone company is a man responsible for the way that business operates and grows. He is the man who lives most in tomorrow. He knows that a business which has no thought for the future just has no future. He must look five years ahead while others look five days or five weeks ahead. He must see the harvest before the seed is sown.

Tomorrow is the chief responsibility of top management. To do something about it calls for courage, imagination, and foresight. Because management has met this obligation so well, America enjoys the greatest living comfort, the highest real wages of any country in the world, and tomorrow's goals are still greater. Neither the men and women in industry nor the money in industry can be effective without good management. Nothing is so important to the workers welfare, the investor's welfare, or the public welfare.

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ACCIDENT MATHEMATICS

THE *Peoples Gas, Light & Coke Co., Chicago,* is using a clever bulletin to drive accident costs home to its employees. The message reads:

Mathematics of Accidents—
—They Subtract
from your pleasure..
—They ADD
to your discomfort.
—They DIVIDE
your income.
—They Multiply
your worries.

• • •

LESSON IN HIRING . . .

FROM out Texas way comes this story of the wire chief who was "a whale of a telephone man, but no beauty." It seems he turned down a man for a job even though help was scarce and the prospective employe, noticing other men leaving with working papers, approached him again and demanded to know why he wasn't hired.

"To tell you the truth," replied the wire chief, "I didn't like your looks."

After a critical examination of the wire chief's own face, the job-hunter asked, "Who in the devil hired you?"

Not having a satisfactory answer for that one, the wire chief put the man to work.

• • •

MISCELLANY . . .

IT IS reported that—*"Men still die with their boots on—but usually one boot is on the accelerator."* . . . A personnel director writes in to say: *"I like to think there are many folks whose virtues have not been discovered in the way Emerson said that a weed was a plant with undiscovered virtues."* . . . Another friend of ours summed up a situation with the observation that—*"We all like the man that says just what he thinks, when he agrees with us."* . . . Walter Axelsen of Automatic dropped this subtle thought our way—*"Because the average American has paid his tax doesn't prove he has money—it merely proves he had money."*

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POLE-SITTING TABBIES . . .

SYMBOLIC of the kind hearts that beat beneath the work jackets of linemen are the numerous news stories concerning their response to calls from agitated householders who appealed for the rescue of their pet cats that were marooned on poles.

It seems that the agile tabby has no difficulty when she goes exploring up a pole. Even the smooth wood surface is easily penetrated by her sharp claws.

Because of the curved shape of her nails, the only way to get to the ground is by backing down—a procedure that simply doesn't appeal to the feline mind. She'd rather take a chance on waiting—which nine times out of 10 she does—until a patient and obliging lineman comes to her rescue.

GLEAMING STAINLESS STEEL

Nothing dull or dingy about this telephone booth. It speaks out a bright, warm "welcome!" A show piece for show-places, this Sherron Stainless Steel booth is equally at home in the most formal of settings. It is designed to attract attention... it is certain to promote pay station patronage.

MORE REASONS WHY THE SHERRON ACOUSTICS STEEL TELEPHONE BOOTH IS TOPS:

- *All-metal rigid construction*
- *Improved door hinges prevent creaking or sticking. Door operates easily and quietly in stainless steel track*
- *Automatic, noiseless door switch controls ceiling light of special design, eliminating current consumption when not in use*
- *Linoleum covered steel floor prevents wear on floor of owner's premises*
- *Adjustable shelf and instrument backboard*
- *Electric ventilating unit of improved type*
- *Steel seat of new design*
- *High grade baked enamel finishes*

SHERRON METALLIC CORPORATION

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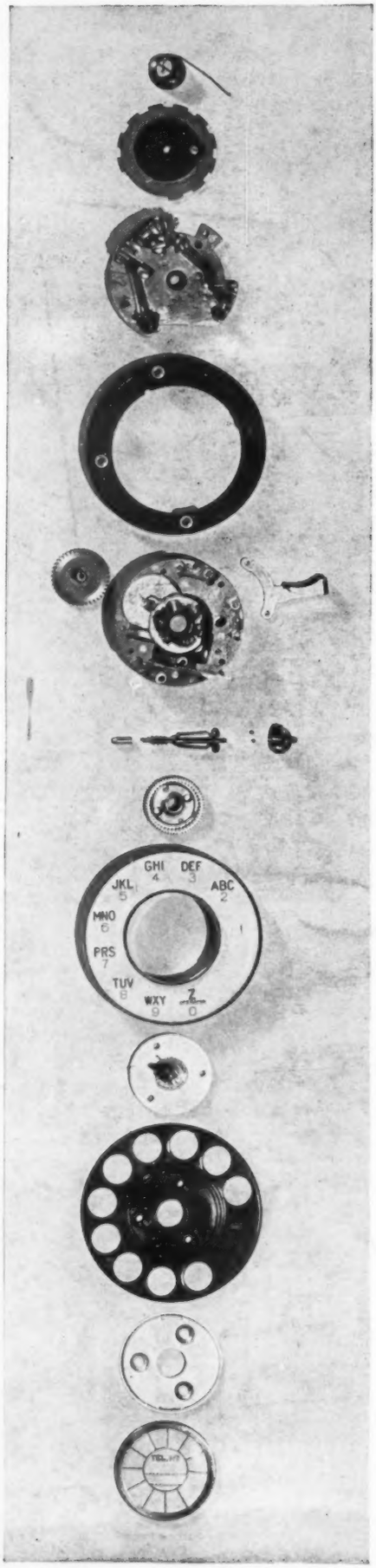

THE NORTH DIAL

A Rugged Driving Spring

A Uniform Pulse Ratio

The Best Contact Spring Material with Precious Metal Double Contacts

Self-Lubricating, Long-Wearing Gears and Bearing Surfaces

Sealed Mechanisms

Uniform Control of Speed

Tested to the Worst Conditions of Weather

Pleasing Appearance

Unsurpassed on Comparative Life Tests

A Vital Necessity In Your Dial Conversion Program

THE NORTH ELECTRIC MANUFACTURING COMPANY

GALION, OHIO